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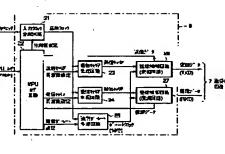
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(54) READER WRITER AND COMMUNICATION CONDITION SETTING METHOD FOR THE SAME



(57)Abstrac

PROBLEM TO BE SOLVED: To give versatility corresponding to various communication conditions and to improve developing efficiency and maintenance efficiency.

SOLUTION: When power is supplied, an MPU I/F circuit 22 decides an initial communication mode as a communication protocol with MPU 5, receives communication condition information from MPU 5 through serial communication, and decodes received communication condition information. Then, it sets the frequency dividing value of an input clock frequency dividing circuit 21 based on the decoded communication condition, sets the

transmission carrier frequency of a transmission carrier generation circuit 23, sets the reception carrier frequency of a reception carrier generation circuit 24, sets the communication baud rate of a communication baud rate generation circuit 25, receives information of the other modes from MPU 5 through serial communication, sets the other modes, validates whole setting and starts communication with a radio card.

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CLAIMS

[Claim(s)]

means, A communication link baud rate generation means to generate a generated with this dividing means, A receiving carrier generation means to generate a carrier generation means to generate a transmitting carrier by the reference clock communication link baud rate clock value A dividing means to carry out dividing of the to have set the received carrier frequency generated with the above-mentioned value, and the reference clock value generated with the above-mentioned dividing carrier frequency, Receive the information on a communication link baud rate clock above-mentioned controlling element, a transmitted carrier frequency, a received above-mentioned dividing means, The reference clock value determined by the communication link baud rate clock by the reference clock generated with the receiving carrier by the reference clock generated with the above-mentioned dividing clock inputted from the outside, and to generate a reference clock, A transmitting clock value, a transmitted carrier frequency, a received carrier frequency, and a receiving carrier generation means as the above-mentioned receiving carrier carrier generation means. The reader writer carry out having provided a setting means transmitting carrier generation means is set as the above-mentioned transmitting means. The transmitted carrier frequency generated with the above-mentioned means based on this received information is set as the above-mentioned dividing [Claim 1] In a reader writer with the controlling element which determines a reference

A transmitting carrier generation means to generate a transmitting carrier by the out dividing of the clock inputted from the outside, and to generate a reference clock dividing value which generates the above-mentioned received carrier frequency as means. The reader writer characterized by providing a setting means to set the carrier frequency is set as the above-mentioned transmitting carrier generation dividing means. The dividing value which generates the above-mentioned transmitted clock generated with the above-mentioned dividing means, and to generate a communication link baud rate generation means to carry out dividing of the reference generation means to carry out dividing of the reference clock generated with the this dividing means, and to generate a transmitting carrier, A receiving carrier clock inputted from the outside, and to generate a reference clock, A transmitting communication link baud rate clock value A dividing means to carry out dividing of the with the above-mentioned dividing means, A reference clock value, a transmitted to generate a communication link baud rate clock by the reference clock generated above-mentioned dividing means, A communication link baud rate generation means information, and determines communication link conditions A dividing means to carry the above-mentioned communication link baud rate generation means. the above-mentioned receiving carrier generation means, and to set the dividing value generates the above-mentioned reference clock value is set as the above-mentioned communication link baud rate clock value, decodes this received serial data, and carrier frequency, The dividing value which receives the serial data of a above-mentioned controlling element, a transmitted carrier frequency, a received communication link baud rate clock, The reference clock value determined by the carrier generation means to carry out dividing of the reference clock generated with clock value, a transmitted carrier frequency, a received carrier frequency, and a above-mentioned communication link baud rate generation means as the description with the above-mentioned communication link baud rate generation means as the carrier frequency, a received carrier frequency, and a storage means by which two or means to generate a receiving carrier by the reference clock generated with the reference clock generated with this dividing means, A receiving carrier generation identification information given to two or more communication link condition [Claim 3] In a reader writer with the controlling element which specifies the which generates the above-mentioned communication link baud rate clock value as above-mentioned dividing means, and to generate a receiving carrier, A [Claim 2] In a reader writer with the controlling element which determines a reference generation means, and to set the communication link baud rate clock value generated

element, and the above-mentioned storage means is searched using this identification storage means by which two or more communication link conditions that identification clock value, a transmitted carrier frequency, a received carrier frequency, and a dividing means, and to generate a communication link baud rate clock, A reference carry out dividing of the reference clock generated with this dividing means, and to outside, and to generate a reference clock, A transmitting carrier generation means to generation means, and to set the communication link baud rate clock value generated generation means. The reader writer carry out having provided a setting means to transmitted carrier frequency generated with the above-mentioned transmitting information retrieved and called is set as the above-mentioned dividing means. The searched using this identification information that received. The reference clock value rate clock value is memorized beforehand, Receive the identification information given to communication link condition information including a communication link baud information that received. The dividing value which generates the reference clock memorized beforehand, Receive the identification information which specifies the dividing value which generates a communication link baud rate clock value are to carry out dividing of the reference clock generated with the above-mentioned dividing of the reference clock generated with the above-mentioned dividing means, generate a transmitting carrier, A receiving carrier generation means to carry out information A dividing means to carry out dividing of the clock inputted from the identification information given to two or more communication link condition [Claim 4] In a reader writer with the controlling element which determines the above-mentioned communication link baud rate generation means as the description. with the above-mentioned communication link baud rate generation means as the have set the received carrier frequency generated with the above-mentioned carrier generation means is set as the above-mentioned transmitting carrier generated with the above-mentioned dividing means as communication link condition above-mentioned controlling element, and the above-mentioned storage means is which specifies the communication link conditions determined by the more communication link condition information that identification information was above-mentioned dividing means. The dividing value which generates a transmitted value as communication link condition information retrieved and called is set as the communication link conditions determined by the above-mentioned controlling information was given to communication link condition information including the and to generate a receiving carrier, A communication link baud rate generation means receiving carrier generation means as the above-mentioned receiving carrier

carrier frequency is set as the above-mentioned transmitting carrier generation means. The reader writer characterized by providing a setting means to set the dividing value which generates a received carrier frequency as the above-mentioned receiving carrier generation means, and to set the dividing value which generates a communication link baud rate clock value as the above-mentioned communication link baud rate generation means.

the above-mentioned dividing means. The transmitted carrier frequency generated with the above-mentioned dividing means based on this received information is set as clock value determined by the above-mentioned controlling element, a transmitted reference clock generated with the above-mentioned dividing means, The reference rate generation means to generate a communication link baud rate clock by the clock generated with the above-mentioned dividing means, A communication link baud transmitting carrier by the reference clock generated with this dividing means, A to generate a reference clock, A transmitting carrier generation means to generate a radio A dividing means to carry out dividing of the clock inputted from the outside, and and a communication link baud rate clock value, and performs a wireless card and reference clock value, a transmitted carrier frequency, a received carrier frequency transmitted from the above-mentioned controlling element, The receiving carrier transmission-control means to generate modulation data from the transmit data the above-mentioned communication link baud rate generation means, and a set up with this setting means, The communication link baud rate clock generated with carrier generated with the above-mentioned transmitting carrier generation means above-mentioned communication link baud rate generation means, The transmitting above-mentioned communication link baud rate generation means as the set the communication link baud rate clock value generated with the generation means as the above-mentioned receiving carrier generation means, and to received carrier frequency generated with the above-mentioned receiving carrier above-mentioned transmitting carrier generation means. A setting means to set the with the above-mentioned transmitting carrier generation means is set as the communication link baud rate clock value, and the reference clock value generated carrier frequency, a received carrier frequency, Receive the information on a receiving carrier generation means to generate a receiving carrier by the reference [Claim 5] In the reader writer which has the controlling element which determines a generated with the above-mentioned receiving carrier generation means set up with data from the received data received from the communication link baud rate clock he above-mentioned setting means, A reception-control means to generate recovery.

generated with the above-mentioned communication link baud rate generation means and the above-mentioned wireless card. The reader writer characterized by providing the control means which controls data processing to the above-mentioned transmit data to the above-mentioned transmission-control means, and controls data processing to the above-mentioned recovery data to the above-mentioned reception-control means.

approach of the reader writer characterized by becoming. value which carries out generation -- since -- the communication link conditioning generation, and sets up the above-mentioned communication link baud rate clock generation, sets up the above-mentioned received carrier frequency which carries out sets up the above-mentioned transmitted carrier frequency which carries out carries out generation is set up based on this received information. the step which link baud rate clock value, and the above-mentioned reference clock value which frequency, a received carrier frequency, Receive the information on a communication determined by the above-mentioned controlling element, a transmitted carrier baud rate clock by the above-mentioned reference clock, The reference clock value above-mentioned reference clock. The step which generates a communication link reference clock, and the step which generates a receiving carrier by the generates a reference clock, The step which generates a transmitting carrier by this value. The step which carries out dividing of the clock inputted from the outside, and frequency, a received carrier frequency, and a communication link baud rate clock controlling element which determines a reference clock value, a transmitted carrier [Claim 7] It is the communication link conditioning approach of a reader writer with th and a reader writer according to claim 5 characterized by being such combination. operation data, addition and deletion of a frame start / frame termination character addition and deletion of synchronous character data, addition and deletion of CRC [Claim 6] Data processing controlled by the above-mentioned control means is

[Claim 8] It is the communication link conditioning approach of a reader writer with the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value. The step which carries out dividing of the clock inputted from the outside, and generates a reference clock, The step which carries out dividing of this reference clock, and generates a transmitting carrier, and the step which carries out dividing of the above-mentioned reference clock, and generates a receiving carrier. The step which carries out dividing of the above-mentioned reference clock, and generates a communication link baud rate clock, The reference clock value determined by the

above—mentioned controlling element, a transmitted carrier frequency, a received carrier frequency. The dividing value which receives the serial data of a communication link baud rate clock value, decodes this received Syria ** data, and generates the above—mentioned reference clock value is set up. the step which sets up the dividing value which generates the above—mentioned transmitted carrier frequency, sets up the dividing value which generates the above—mentioned received carrier frequency, and sets up the dividing value which generates the above—mentioned communication link baud rate clock value — since — the communication link conditioning approach of the reader writer characterized by becoming

communication link condition information, and which carries out generation, set up the determined by the above-mentioned controlling element, search the identification information that identification information was given to communication link condition step which memorizes beforehand two or more communication link condition carrier by the above-mentioned reference clock, The step which generates a condition information, and determines communication link conditions, and is inputted specifies the identification information given to two or more communication link writer characterized by becoming. generation, since -- the communication link conditioning approach of the reader up the above-mentioned communication link baud rate clock value which carries out above-mentioned transmitted carrier frequency which carries out generation, set up step set up the above-mentioned reference clock value which is included in this information which is carrying out [above-mentioned] storage using this identification the identification information which specifies the communication link conditions received carrier frequency, and a communication link baud rate clock value, Receive information including a reference clock value, a transmitted carrier frequency, a communication link baud rate clock by the above-mentioned reference clock, The transmitting carrier by this reference clock, and the step which generates a receiving from the outside, and generates a reference clock, The step which generates a link conditioning approach of a reader writer with the controlling element which [Claim 9] The step which carries out dividing of the clock which is the communication the above—mentioned received carrier frequency which carries out generation, and set information that received, and communication link condition information is called. The

[Claim 10] The step which carries out dividing of the clock which is the communication link conditioning approach of a reader writer with the controlling element which determines the identification information given to two or more

baud rate clock value -- since -- the communication link conditioning approach of the connoisseur -- the step which sets up the dividing value which generates a which generates the reference clock value included in principle ***** is set up. this carrying out [above-mentioned] storage using this identification information that above-mentioned controlling element, search the identification information which is which specifies the communication link conditions determined by the and a communication link baud rate clock value, Receive the identification information a reference clock value, a transmitted carrier frequency, a received carrier frequency, communication link condition information including the dividing value which generates more communication link conditions that identification information was given to communication link baud rate clock, The step which memorizes beforehand two or which carries out dividing of the above-mentioned reference clock, and generates a clock, and generates a transmitting carrier, and the step which carries out dividing of generates a reference clock, The step which carries out dividing of this reference communication link condition information, and is inputted from the outside, and carrier frequency, and sets up the dividing value which generates a communication link transmitted carrier frequency, sets up the dividing value which generates a received received, and communication link condition information is called. The dividing value the above-mentioned reference clock, and generates a receiving carrier, The step reader writer characterized by becoming

set up based on this received information. The step which sets up the step which generates a receiving carrier by the above-mentioned reference clock, clock. The step which generates a transmitting carrier by this reference clock, and the baud rate clock value. The step which carries out dividing of the clock which is the sets up the above-mentioned communication link baud rate clock value which carries the above-mentioned received carrier frequency which carries out generation, and value, and the above-mentioned reference clock value which carries out generation is carrier frequency, Receive the information on a communication link baud rate clock above-mentioned controlling element, a transmitted carrier frequency, a received above-mentioned reference clock, The reference clock value determined by the The step which generates a communication link baud rate clock by the wireless card and radio, and is inputted from the outside, and generates a reference communication link conditioning approach of the reader writer which performs a transmitted carrier frequency, a received carrier frequency, and a communication link [Claim 11] It has the controlling element which determines a reference clock value, a above-mentioned transmitted carrier frequency which carries out generation, sets up

out generation, The transmitting carrier generated by the transmitted carrier frequency by which a setup was carried out [above-mentioned], the communication link baud rate clock generated with the communication link baud rate clock value by which a setup was carried out [above-mentioned]. The step which generates modulation data from the transmit data transmitted from the above-mentioned controlling element. The step which generates recovery data from the received data received from the receiving carrier generated by the received carrier frequency by which a setup was carried out [above-mentioned], the communication link baud rate clock generated with the above-mentioned communication link baud rate clock generated with the above-mentioned wireless card, the step which controls data processing to the above-mentioned transmit data, and controls data processing to the above-mentioned recovery data — since — the communication link conditioning approach of the reader writer characterized by becoming.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[Field of the Invention] This invention exchanges data between high order equipment and a wireless card, and relates to the communication link conditioning approach of a reader writer and a reader writer which consists of an interface with these, and MPU which controls the whole.

8 8 2

[Description of the Prior Art] Conventionally, the wireless card processing system for wireless cards consists of a host (high order equipment, PC), a reader writer (R/W),

and a wireless card. The above-mentioned reader writer connects a host (PC) and a wireless card. This reader writer is constituted by the interface and transceiver circuit which consist of MPU and LSI which control the whole.

[0003] The wireless (IC) card is operating on various communication link conditions by the class each. The reader writer for performing the communication link with these wireless card until now was manufacturing respectively the thing with the communicate mode corresponding to the communication link conditions of a wireless card. Therefore, it is necessary to prepare the reader writer B' for a wireless card with the communication link conditions [writer / A' / reader] B at a wireless card with the communication link conditions A.

[0004] The communication link conditions said here are a "received carrier frequency", a "transmitted carrier frequency", and a "transceiver communication link baud rate."

[0005] However, making a reader writer according to the communication link conditions of each wireless card has very bad development effectiveness. Moreover, although making a reader writer with other completely equivalent functions only from only communication link conditions differing by the class of a wireless card did not have a problem technically, the effort serious in development effectiveness and a maintenance side occurred, and there was a problem that effectiveness worsened. [0006]

[Problem(s) to be Solved by the Invention] Although making a reader writer according to the communication link conditions of each wireless card had very bad development effectiveness and it did not have a problem technically that only communication link conditions only differ and other functions completely make an equivalent reader writer by the class of a wireless card as described above, the effort serious in development effectiveness and a maintenance side occurred, and there was a problem that effectiveness worsened.

[0007] Then, this invention gives the versatility corresponding to various communication link conditions, and aims at offering the communication link conditioning approach of a reader writer and a reader writer which can raise development effectiveness and the effectiveness of a maintenance.

[Means for Solving the Problem] In a reader writer with the controlling element as which the reader writer of this invention determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value A dividing means to carry out dividing of the clock inputted from

value generated with the above-mentioned communication link baud rate generation setting means to set the received carrier frequency generated with the baud rate clock by the reference clock generated with the above-mentioned dividing receiving carrier, A communication link baud rate generation means to carry out clock generated with the above-mentioned dividing means, and to generate a carrier, A receiving carrier generation means to carry out dividing of the reference reference clock generated with this dividing means, and to generate a transmitting means to carry out dividing of the clock inputted from the outside, and to generate a received carrier frequency, and a communication link baud rate clock value A dividing this invention determines a reference clock value, a transmitted carrier frequency, a is set as the above-mentioned transmitting carrier generation means. It consists of frequency generated with the above-mentioned transmitting carrier generation means information is set as the above-mentioned dividing means. The transmitted carrier value generated with the above-mentioned dividing means based on this received element, a transmitted carrier frequency, a received carrier frequency, Receive the means. The reference clock value determined by the above-mentioned controlling communication link baud rate generation means to generate a communication link the reference clock generated with the above-mentioned dividing means, A transmitting carrier generation means. It consists of setting means to set the dividing above-mentioned transmitted carrier frequency is set as the above-mentioned above-mentioned dividing means. The dividing value which generates the and generates the above-mentioned reference clock value is set as the data of a communication link baud rate clock value, decodes this received serial data, frequency, a received carrier frequency, The dividing value which receives the serial determined by the above-mentioned controlling element, a transmitted carrier and to generate a communication link baud rate clock, The reference clock value dividing of the reference clock generated with the above-mentioned dividing means, reference clock, A transmitting carrier generation means to carry out dividing of the [0009] In a reader writer with the controlling element as which the reader writer of means as the above-mentioned communication link baud rate generation means. receiving carrier generation means, and to set the communication link baud rate clock above-mentioned receiving carrier generation means as the above-mentioned information on a communication link baud rate clock value, and the reference clock dividing means, A receiving carrier generation means to generate a receiving carrier by means to generate a transmitting carrier by the reference clock generated with this the outside, and to generate a reference clock, A transmitting carrier generation transmitting carrier generation means to carry out dividing of the reference clock dividing of the clock inputted from the outside, and to generate a reference clock, A above-mentioned communication link baud rate generation means as the and to set the communication link baud rate clock value generated with the carrier generation means as the above-mentioned receiving carrier generation means to set the received carrier frequency generated with the above-mentioned receiving above-mentioned transmitting carrier generation means. It consists of setting means the above-mentioned transmitting carrier generation means is set as the communication link condition information retrieved and called is set as the storage means is searched using this identification information that received. The generation means to generate a receiving carrier by the reference clock generated carrier by the reference clock generated with this dividing means, A receiving carrier link condition information, and determines communication link conditions A dividing or more communication link condition information A dividing means to carry out identification information by which the reader writer of this invention was given to two above-mentioned communication link baud rate generation means. above-mentioned dividing means. The transmitted carrier frequency generated with reference clock value generated with the above-mentioned dividing means as determined by the above-mentioned controlling element, and the above-mentioned communication link baud rate clock value is memorized beforehand, Receive the information was given to communication link condition information including a which two or more communication link condition information that identification transmitted carrier frequency, a received carrier frequency, and a storage means by generated with the above-mentioned dividing means, A reference clock value, a means to generate a communication link baud rate clock by the reference clock with the above-mentioned dividing means, A communication link baud rate generation reference clock. A transmitting carrier generation means to generate a transmitting means to carry out dividing of the clock inputted from the outside, and to generate a invention specifies the identification information given to two or more communication the above-mentioned communication link baud rate generation means. which generates the above-mentioned communication link baud rate clock value as above-mentioned receiving carrier generation means, and to set the dividing value [0011] In a reader writer with the controlling element which determines the identification information which specifies the communication link conditions [0010] In a reader writer with the controlling element which the reader writer of this value which generates the above-mentioned received carrier frequency as the

> communication link baud rate generation means. which generates a communication link baud rate clock value as the above-mentioned above-mentioned receiving carrier generation means, and to set the dividing value means to set the dividing value which generates a received carrier frequency as the the above-mentioned transmitting carrier generation means. It consists of setting means. The dividing value which generates a transmitted carrier frequency is set as condition information retrieved and called is set as the above-mentioned dividing dividing value which generates the reference clock value as communication link storage means is searched using this identification information that received. The determined by the above-mentioned controlling element, and the above-mentioned a communication link baud rate clock value are memorized beforehand, Receive the communication link condition information including the dividing value which generates communication link conditions that identification information was given to frequency, a received carrier frequency, and a storage means by which two or more communication link baud rate clock, A reference clock value, a transmitted carrier clock generated with the above-mentioned dividing means, and to generate a communication link baud rate generation means to carry out dividing of the reference the above-mentioned dividing means, and to generate a receiving carrier, A identification information which specifies the communication link conditions carrier generation means to carry out dividing of the reference clock generated with generated with this dividing means, and to generate a transmitting carrier, A receiving

[0012] In the reader writer which the reader writer of this invention has the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value, and performs a wireless card and radio A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to generate a transmitting carrier by the reference clock generated with this dividing means, A receiving carrier generation means to generate a receiving carrier by the reference clock generated with the above-mentioned dividing means, A communication link baud rate clock by the reference clock generated with the above-mentioned dividing means, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, Receive the information on a communication link baud rate clock value, and the reference clock value generated with the above-mentioned dividing means based on this received information is set as the above-mentioned dividing means. The transmitted carrier

frequency which carries out generation, and sets up the above-mentioned by consisting of a step which sets up the above-mentioned transmitted carrier carries out generation is set up based on this received information. It is characterized link baud rate clock value, and the above-mentioned reference clock value which determined by the above-mentioned controlling element, a transmitted carrier baud rate clock by the above-mentioned reference clock, The reference clock value above-mentioned reference clock, The step which generates a communication link reference clock, and the step which generates a receiving carrier by the generates a reference clock. The step which generates a transmitting carrier by this value. The step which carries out dividing of the clock inputted from the outside, and frequency, a received carrier frequency, and a communication link baud rate clock controlling element which determines a reference clock value, a transmitted carrier invention It is the communication link conditioning approach of a reader writer with the [0013] The communication link conditioning approach of the reader writer this recovery data to the above-mentioned reception-control means. transmission-control means, and control data processing to the above-mentioned data processing to the above-mentioned transmit data to the above-mentioned and the above-mentioned wireless card, it consists of control means which control generated with the above-mentioned communication link baud rate generation means data from the received data received from the communication link baud rate clock the above-mentioned setting means, A reception-control means to generate recovery generated with the above-mentioned receiving carrier generation means set up with transmitted from the above-mentioned controlling element. The receiving carrier transmission-control means to generate modulation data from the transmit data the above-mentioned communication link baud rate generation means, and a set up with this setting means, The communication link baud rate clock generated with carrier generated with the above-mentioned transmitting carrier generation means above-mentioned communication link baud rate generation means, The transmitting above-mentioned communication link baud rate generation means as the and to set the communication link baud rate clock value generated with the carrier generation means as the above-mentioned receiving carrier generation means to set the received carrier frequency generated with the above-mentioned receiving is set as the above-mentioned transmitting carrier generation means. A setting means frequency which carries out generation, sets up the above-mentioned received carrier frequency, a received carrier frequency, Receive the information on a communication frequency generated with the above-mentioned transmitting carrier generation means

transmitting carrier by this reference clock, and the step which generates a receiving link conditioning approach of a reader writer with the controlling element which invention The step which carries out dividing of the clock which is the communication [0015] The communication link conditioning approach of the reader writer this above-mentioned transmitted carrier frequency, sets up the dividing value which consisting of a step which sets up the dividing value which generates the communication link baud rate clock value, decodes this received Syria ** data, and carrier frequency, The dividing value which receives the serial data of a above-mentioned controlling element, a transmitted carrier frequency, a received communication link baud rate clock, The reference clock value determined by the which carries out dividing of the above-mentioned reference clock, and generates a the above-mentioned reference clock, and generates a receiving carrier. The step clock, and generates a transmitting carrier, and the step which carries out dividing of generates a reference clock, The step which carries out dividing of this reference controlling element which determines a reference clock value, a transmitted carrier invention It is the communication link conditioning approach of a reader writer with the information which is carrying out [above-mentioned] storage using this identification information including a reference clock value, a transmitted carrier frequency, a information that identification information was given to communication link condition step which memorizes beforehand two or more communication link condition carrier by the above-mentioned reference clock, The step which generates a from the outside, and generates a reference clock, The step which generates a condition information, and determines communication link conditions, and is inputted specifies the identification information given to two or more communication link value which generates the above-mentioned communication link baud rate clock value. generates the above-mentioned received carrier frequency, and sets up the dividing generates the above-mentioned reference clock value is set up. It is characterized by value. The step which carries out dividing of the clock inputted from the outside, and frequency, a received carrier frequency, and a communication link baud rate clock [0014] The communication link conditioning approach of the reader writer this determined by the above-mentioned controlling element, search the identification communication link baud rate clock by the above-mentioned reference clock, The communication link baud rate clock value which carries out generation information that received, and communication link condition information is called. It the identification information which specifies the communication link conditions eceived carrier frequency, and a communication link baud rate clock value, Receive

carries out setting up the above-mentioned reference clock value which is included in this communication link condition information and which carries out generation, setting up the above-mentioned transmitted carrier frequency which carries out generation, setting up the above-mentioned received carrier frequency which carries out generation, and becoming from the step set up about the above-mentioned communication link baud rate clock value which carries out generation as the description.

generates a received carrier frequency, and sets up the dividing value which which generates a transmitted carrier frequency, sets up the dividing value which the reference clock value included in principle *****, sets up the dividing value characterized by consisting of a step which sets up the dividing value which generates communication link condition information is called. this connoisseur -- it is [above-mentioned] storage using this identification information that received, and element, search the identification information which is carrying out communication link conditions determined by the above-mentioned controlling baud rate clock value, Receive the identification information which specifies the transmitted carrier frequency, a received carrier frequency, and a communication link information including the dividing value which generates a reference clock value, a conditions that identification information was given to communication link condition rate clock. The step which memorizes beforehand two or more communication link of the above-mentioned reference clock, and generates a communication link baud reference clock, and generates a receiving carrier, The step which carries out dividing clock. The step which carries out dividing of this reference clock, and generates a condition information, and is inputted from the outside, and generates a reference determines the identification information given to two or more communication link link conditioning approach of a reader writer with the controlling element which invention The step which carries out dividing of the clock which is the communication [0016] The communication link conditioning approach of the reader writer this generates a communication link baud rate clock value. transmitting carrier, and the step which carries out dividing of the above-mentioned

> and the above-mentioned wireless card, It is characterized by consisting of a step set up based on this received information. The step which sets up the which controls data processing to the above-mentioned transmit data, and controls clock generated with the above-mentioned communication link baud rate clock value which a setup was carried out [above-mentioned], the communication link baud rate received from the receiving carrier generated by the received carrier frequency by controlling element. The step which generates recovery data from the received data modulation data from the transmit data transmitted from the above-mentioned which a setup was carried out [above-mentioned]. The step which generates out generation, The transmitting carrier generated by the transmitted carrier sets up the above-mentioned communication link baud rate clock value which carries the above-mentioned received carrier frequency which carries out generation, and above-mentioned transmitted carrier frequency which carries out generation, sets up value, and the above-mentioned reference clock value which carries out generation is carrier frequency, Receive the information on a communication link baud rate clock above-mentioned reference clock. The reference clock value determined by the step which generates a receiving carrier by the above-mentioned reference clock, link baud rate clock generated with the communication link baud rate clock value by frequency by which a setup was carried out [above-mentioned], the communication above-mentioned controlling element, a transmitted carrier frequency, a received The step which generates a communication link baud rate clock by the data processing to the above-mentioned recovery data clock, The step which generates a transmitting carrier by this reference clock, and the

[0018

[Embodiment of the Invention] Hereafter, the gestalt of 1 implementation of this invention is explained with reference to a drawing.

[0019] <u>Drawing 1</u> shows the outline configuration of the wireless card processing system concerning this invention.

[0020] That is, the wireless card processing system is constituted by the wireless (IC) card 4 which performs radio, and — between the personal computer (PC) 1 as high order equipment, and the antenna section 3 of the reader writer (R/W) 2 connected to this PC1, and this reader writer 2.

[0021] PC1 is constituted by the control section which is not illustrated, the control unit, the display, and the connection of the reader writer 2.

baud rate clock value. The step which carries out dividing of the clock which is the

invention It has the controlling element which determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link

[0017] The communication link conditioning approach of the reader writer this

communication link conditioning approach of the reader writer which performs a

wireless card and radio, and is inputted from the outside, and generates a reference

[0022] The reader writer 2 is constituted by MPU5 as a control circuit (controlling element) which controls the whole reader writer 2. LSI6 for the wireless card reader

writers as an interface, the transceiver circuit 7, the antenna section 3, and the input-clock frequency divider 21.

[0023] MPU5 memorizes CPU11 which controls whole MPU5, a control program, and various ****, and is constituted by S1013 the input of the serial data for the communication link with the memory 12 and LSI6 which consist of RAM and a ROM, and for output.

[0024] It connects with the above PC 1, an exchange of data is performed, and CPU11 transmits a data lead command to LSI6 to reception of a data lead command.

[0025] The I/O Port the I/O Port of ** and for the serial input (data SI) serial output

[0025] The I/O Port the I/O Port of ** and for the serial input (data SI) serial output data (SO), the I/O Port for serial clocks (SCK), and the I/O Port for control signals (CONT) are formed in the above S1013.

[0026] the above S1013 — the data lead command of the wireless card 4 — the I/O Port for SI — mustard — it outputs to SI6.

[0027] The antenna section 3 is constituted by the transmitting antenna 14 and the receiving antenna 15.

[0028] The above-mentioned transceiver circuit 7 is constituted by the sending circuit 16 and the receiving circuit 17.

[0029] The wireless card 4 is constituted by the memory which memorizes various information, such as a control circuit which controls the whole, a control program, a random number, and ID (recognition number) data, the modulation demodulator circuit, the power—source generating circuit, and the transceiver antenna.

[0030] <u>Drawing 2</u> shows the outline configuration of LSI6. LSI6 consists of the input-clock frequency divider 21, MPUI/F22, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, a communication link baud rate generation circuit 25, a transmission-control circuit (modulation circuit) 26, and a reception-control circuit (demodulator circuit) 27.

[0031] The input-clock frequency divider 21 carries out dividing of the external clock inputted into the reader writer 2, and generates the clock used as the criteria of a system. For example, the function of the general-purpose reader writer by this invention can be made into that more flexible by establishing the dividing value of 1/1 / 1.5, 1/2, and a 1 / 4 grades. [1 and 1]

[0032] The MPUI/F circuit 22 is an interface (I/F) circuit for software to perform automatically a setup of each register of the above-mentioned input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit 25 through the serial terminal of MPU5. By receiving and decoding the serial data from

MPU5, each register of the above-mentioned input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit 25 is set up. [0033] The transmitting carrier generation circuit 23 is for setting up the transmitted carrier frequency to the wireless card 4 from the reference clock generated in the input-clock frequency divider 21. It realizes by carrying out dividing of the reference

[0034] The receiving carrier generation circuit 24 is for setting up the received carrier frequency of the received data from the wireless card 4 from the reference clock generated in the input-clock frequency divider 21. It realizes by carrying out dividing of the reference clock to any value.

clock to any value.

[0035] The communication link baud rate generation circuit 25 is for setting up a communication link baud rate clock (one 16 times the frequency of a baud rate) with the wireless card 4 from the reference clock generated in the input-clock frequency divider 21. It realizes by carrying out dividing of the reference clock to any value. [0036] The transmission-control circuit 26 is a circuit which generates the modulation data to the wireless card 4 with the transmitting carrier generated in the transmitting carrier generated in the transmitting carrier generation circuit 23, the communication link baud rate generation circuit 25, and the transmit data from the

[0037] The reception—control circuit 27 is a circuit which generates the recovery data to MPU5 with the received data from the wireless card 4, the receiving carrier generated in the receiving carrier generation circuit 24, and the communication link baud rate clock generated in the communication link baud rate generation circuit 25. [0038] Next, in such a configuration, actuation of the reader writer 2 is explained with reference to the flow chart of <u>drawing 3</u>.

[0039] When a power source is switched on (ST1), the MPUI/F circuit 22 judges the initial communicate mode as a communications protocol with MPU5 (ST2).

[0040] According to this judgment, the MPUI/F circuit 22 receives communication link condition through serial communication from MPU5. Decode the received communication link condition information and the dividing value of the input-clock

condition information through serial communication from MPU5. Decode the received communication link condition information and the dividing value of the input-clock frequency divider 21 is set up based on this decoded communication link condition (ST3). The transmitted carrier frequency of the transmitting carrier generation circuit 23 is set up (ST4), the received carrier frequency of the receiving carrier generation circuit 24 is set up (ST5), and the communication link baud rate of the communication link baud rate generation circuit 25 is set up (ST6).

[0041] And from MPU5, the MPUI/F circuit 22 receives the information on the other modes through serial communication, sets up the other modes (ST7), confirms all setup (ST8), and starts the communication link with the wireless card 4 (ST22). [0042] Communication link conditions with the wireless card 4 are set up by the routine of the step 3-STs 6 mentioned above. However, this order of a setup does not ask. These setup is automatically performed after powering on by the software memorized by the memory 12 of MPU5 using serial I/F of MPU5.

[0043] Next, the 1st example in the reader writer 2 constituted concretely is explained with reference to drawing 4. A setup of the reader writer 2 for enabling the communication link with the wireless card 4 which operates on the following communication link conditions is as follows.

[0044] communication link condition input-clock frequency: — 16MHz transmitted carrier frequency: — 125kHz received carrier frequency: — 62.5kHz communication link baud rate: — 7800 bpsMPUI/F circuits 22 follow the flow shown by <u>drawing 3</u>, and set up the reader writer 2. First, in setting up each register in a step 3–STs 6, MPU5 decides what kind of value to set up beforehand.

[0045] Then, it receives through serial communication from MPU5, and the MPUI/F circuit 22 sets up the value determined here to each register of the input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit 25.

[0046] A setup of each register to communication link conditions here is as follows. [0047] a. Set the input-clock dividing value of the input-clock frequency divider 21 as one half, and generate the reference clock (8MHz) used as the base of actuation of the reader writer 2 from an input clock (16MHz).

[0048] b. In order to generate the transmitted carrier frequency (125kHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the transmitting carrier generation circuit 23 as 1/64.

[0049] c. In order to generate the received carrier frequency (62.5kHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the receiving carrier generation circuit 24 as 1/128.

[0050] d. In order to set up the communication link baud rate (7800bps) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the communication link baud rate generation circuit 25 as 1/64. The clock generated here is 16 times the frequency of a baud rate.

[0051] Thus, by setting up, the communication link with the wireless card 4 equipped

with the above-mentioned communication link conditions is attained. However, the order of a setup of a, b, c, and d does not ask. Moreover, the set point (dividing value) of each register shown here is an example, and must not necessarily be set up in this way to the above-mentioned communication link conditions. A system construction person can specify the set point of each register as arbitration.

[0052] Next, the 2nd example in the reader writer 2 constituted concretely is explained with reference to $\frac{1}{2}$ or $\frac{1}{2}$. An input clock is changed into 8MHz to the communication link conditions shown by $\frac{1}{2}$ and other conditions are the same as drawing 4.

[0053] The MPUI/F circuit 22 follows the flow shown by $\frac{drawing\ 3}{2}$, and sets up the reader writer 2.

[0054] a. Set the input-clock dividing value of the input-clock frequency divider 21 as 1/1, and generate the reference clock (8MHz) used as the base of actuation of the reader writer 2 from an input clock (8MHz). In addition, about the dividing value of the b. transmitting carrier generation circuit 23, the dividing value of the c. receiving carrier generation circuit 24, and the dividing value of d. communication link baud rate generation circuit 25, it is the same as drawing 4.

[0055] Thus, by setting up, the communication link with the wireless card 4 equipped with the above-mentioned communication link conditions is attained. However, the order of a setup of Above a, b, c, and d does not ask. Moreover, the set point (dividing value) of each register shown here is an example, and must not necessarily be set up in this way to the above-mentioned communication link conditions. A system construction person can specify the set point of each register as arbitration. [0056] Next, the 3rd example in the reader writer 2 constituted concretely is explained with reference to drawing 6. A setup of the reader writer 2 for enabling the communication link with the wireless card 4 which operates on the following communication link conditions is as follows.

[0057] communication link condition input-clock frequency: — 13.56MHz transmitted carrier frequency: — 3.322MHz received carrier frequency: — 847.5kHz communication link baud rate: — 106 kbpsMPUI/F circuits 22 follow the flow shown by drawing 3, and set up the reader writer 2. First, in setting up each register in a step 3-STs 6, MPU5 decides what kind of value to set up beforehand.

[0058] Then, it receives through serial communication from MPU5, and the MPU1/F circuit 22 sets up the value determined here to each register of the input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit

25

[0059] A setup of each register to communication link conditions here is as follows. [0060] a. Set the input-clock dividing value of the input-clock frequency divider 21 as 1/1, and generate the reference clock (13.56MHz) used as the base of actuation of a reader writer from an input clock (13.56MHz).

[0061] b. In order to generate the transmitted carrier frequency (3.322MHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the transmitting carrier generation circuit 23 as one fourth.

[0062] c. In order to generate the received carrier frequency (847.5kHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the receiving carrier generation circuit 24 as 1/16.

[0063] d. In order to set up the communication link baud rate to the reference clock generated in the input-clock frequency divider 21 (106kbps), set the dividing value of the communication link baud rate generation circuit 25 as one eighth. The clock generated here is 16 times the frequency of a baud rate.

[0064] Thus, by setting up, the communication link with the wireless card 4 equipped with the above-mentioned communication link conditions is attained. However, the order of a setup of a, b, c, and d does not ask moreover, the set point (dividing value) of each register shown here is an example, and is not necessarily set up in this way to the above-mentioned communication link conditions—it can kick, and if it is **, there is not necessarily nothing. A system construction person can specify the set point of each register as arbitration.

[0065] Next, the 4th example adapting the configuration in the reader writer 2 is explained with reference to <u>drawing 7</u>. In this example, the communication link conditioning data storage memory 28 is prepared as an additional function.

[0066] In order to confirm the reader writer 2 to the wireless card 4 which is operating by the radical of some communication link conditions as shown above, it is necessary to set up each setting register of a step 3-STs 6 from MPU5. Although the register is accessed and set up according to an individual, respectively, now, processing occurs repeatedly and it becomes complicated.

[0067] So, in this example, the communication link conditioning data storage memory 10 which made these setting information memorize beforehand is prepared, and it specifies which [of memory information] MPU5 confirms. The MPUI/F circuit 22 sets up a communication link condition register automatically from the specified memory information.

[0068] Here, processing actuation of **** 4 example is explained with reference to

the flow chart of drawing 8

[0069] When a power source is switched on (ST11), the MPUI/F circuit 22 judges the initial communicate mode as a communications protocol with MPU5 (ST12).

[0070] According to assignment of which [of the memory information from MPU5] the MPUI/F circuit 22 confirms, memory information is called from the communication link conditioning data storage memory 28 (ST13). Decode the contents of this memory information (ST14), and the dividing value of the input-clock frequency divider 21 is set up based on this decoded communication link conditioning data (ST15). The transmitted carrier frequency of the transmitting carrier generation circuit 23 is set up (ST16), the received carrier frequency of the receiving carrier generation circuit 24 is set up (ST17), and the communication link baud rate of the communication link baud rate generation circuit 25 is set up (ST18).

[0071] And from MPU5, the MPUI/F circuit 22 sets up the other modes through serial communication (ST19), confirms all setup (ST20), and starts the communication link with the wireless card 4 (ST21).

[0072] <u>Drawing 9</u> is the example of a configuration of the memory information stored in the communication link conditioning data storage memory 28. For example, when a specification is in ISO10xxx mode, the address is set up with the 00th street and the function (register set point) is set up with input clocks 1/1, the transmitting carriers 1/1, the receiving carriers 1/16, and baud rates 1/32.

[0073] In the example of a configuration of this memory information, register setting information is arranged in the communication link conditioning data storage memory 28 for every functional specifications. When making it a setup corresponding to ISO10xxx mode, MPU5 can set up the reader writer 2 by [of the communication link conditioning data storage memory 28] confirming the 00th street.

[0074] <u>Drawing 10</u> is other examples of a configuration of the memory information stored in the communication link conditioning data storage memory 28. For example, in the case of input-clock:16MHz, transmitting carrier:125kHz, receiving carrier:62.5kHz, and communication link baud rate:7800bps, the address is set up with the 00th street and the function (register set point) is set up for the specification with input clocks 1/2, the transmitting carriers 1/64, the receiving carriers 1/128, and baud rates 1/64. [0075] In the example of a configuration of this memory information, register setting information is arranged in the communication link conditions. For example, by setting the communication link conditions shown by <u>drawing 4</u> as the 00th street of the communication link conditioning data storage memory 28, if the 00th street is

confirmed, a setup of the reader writer 2 will become the thing corresponding to this communication link condition which is the communication link conditioning data storage memory 10 from MPU5.

[0076] Next, the 5th example is explained with reference to drawing 11.

[0077] The differences with $\frac{\text{drawing }2}{\text{circuit }31}$ and the reception-control circuit 32.

[0078] The transmission—control circuit (modulation circuit) 31 is a circuit which generates the modulation data to the wireless card 4 with the transmitting carrier generated in the transmitting carrier generation circuit 23, the communication link baud rate clock generated in the communication link baud rate generation circuit 25, and the transmit data from the MPUI/F circuit 22. Moreover, the existence of data processing is controllable by the data—processing control signal from the MPUI/F circuit 22 to transmit data.

[0079] Specifically, it is addition of 1 synchronous character data. At this time, the character value and character length of a synchronous character can specify it as arbitration from MPU5 separately.

[0080] 2) Addition of CRC operation data.

[0081] 3) Addition of a frame start character / frame termination character. Addition of a frame start/termination character can be specified according to an individual. [0082] It has ******.

[0083] The reception-control circuit (demodulator circuit) 32 is a circuit which generates the recovery data to MPU5 with the received data from the wireless card 4, the receiving carrier generated in the receiving carrier generation circuit 24, and the communication link baud rate clock generated in the communication link baud rate generation circuit 25. Moreover, the existence of processing of data is controllable by the data-processing control signal from the MPUI/F circuit 22 to recovery data. [0084] Specifically, it is deletion of 1 synchronous character data. At this time, the character value and character length of a synchronous character can specify it as arbitration from MPU5 separately.

[0085] 2) CRC operation acknowledgement function (error detection function).

[0086] 3) Deletion of a frame start character / frame termination character. Deletion of a frame start/termination character can be specified according to an individual. [0087] It has ******.

[0088] <u>Drawing 12</u> is the example of transmit data processing by the data-processing control signal in the transmission-control circuit 31. The radical data shown in (a) of <u>drawing 12</u> are serial data transmitted from MPU5, and are these data which should be

transmitted to the wireless card 4. Hereafter, six sorts of examples are shown and processing of the data to this radical data is explained. It is the example which is shown here to the last, and it is not what showed all realizable combination. [0089] (b) shows the condition of the transmit data in the case of adding 1 byte of synchronous character. The synchronous character is added to the head of radical

synchronous character. The synchronous character is added to the head of radical data. For example, the character of 92H is added.

[0090] (c) shows the condition of the transmit data in the case of adding 2 bytes of synchronous character. The synchronous character is added to the head of radical data. For example, the character of 9292H is added.

[0091] (d) shows the condition of the transmit data in the case of adding a CRC operation. The CRC operation was performed to radical data and the result of an operation is added after the last data transmission of these data. For example, wher calculating CRC16, the result of an operation is added to 16 bits.

[0092] (e) shows the condition of the transmit data in the case of adding an initiation frame (SOF) / termination frame (EOF) before and after radical data, respectively. For example, the "High level" of a triplet can be added from the "Low level" of 10 to 11 bits, and 2 as SOF. Moreover, the "Low level" of 10 to 11 bits can be added as EOF. [0093] (f) shows the condition of the transmit data in the case of adding an initiation frame (SOF) to the anterior part of radical data.

[0094] (g) shows the condition of the transmit data in the case of adding a termination frame (EOF) to the posterior part of radical data.

[0095] Processing of the recovery data based on the data-processing control signal in the reception-control circuit 32 performs the reverse of transmit data processing shown in (b) – (g) of $\underline{\text{drawing }12}$. For example, the recovery data which deleted only the synchronous character from the recovery data with which the synchronous character was added to the head are generated, and it transmits as serial data to MPU5 (radical data are generated from the data of (b) of $\underline{\text{drawing }12}$).

[0096] As explained above, according to the gestalt of implementation of the above-mentioned invention, the general-purpose reader writer corresponding to a wireless card with various communication link conditions (an input-clock frequency, a received carrier frequency, a transmitted carrier frequency, transceiver communication link baud rate) is realizable.

[0097] Moreover, by using a reader writer widely, the need of manufacturing the reader writer system corresponding to each wireless card according to an individual is lost, and development effectiveness and the effectiveness of a maintenance improve.

[0098] Moreover, a functional setting register can be performed through serial I/F of

MPU, and since it has realized without adding an extraordinarily difficult function, it can master easily only by getting to know the fundamental operating instructions of MPU.

[0099] In addition, it becomes possible from MPU by storing information in memory also about each setting command about processing control of a transmitted and received data to set up automatically.

0100

[Effect of the Invention] As explained in full detail above, according to this invention, the versatility corresponding to various communication link conditions can be given, and the communication link conditioning approach of a reader writer and a reader writer which can raise development effectiveness and the effectiveness of a maintenance can be offered.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention exchanges data between high order equipment and a wireless card, and relates to the communication link conditioning approach of a reader writer and a reader writer which consists of an interface with these, and MPU which controls the whole.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] Conventionally, the wireless card processing system for wireless cards consists of a host (high order equipment, PC), a reader writer (R/W), and a wireless card. The above-mentioned reader writer connects a host (PC) and a wireless card. This reader writer is constituted by the interface and transceiver circuit which consist of MPU and LSI which control the whole.

[0003] The wireless (IC) card is operating on various communication link conditions by the class each. The reader writer for performing the communication link with these wireless card until now was manufacturing respectively the thing with the communicate mode corresponding to the communication link conditions of a wireless card. Therefore, it is necessary to prepare the reader writer B' for a wireless card with the communication link conditions [writer / A' / reader] B at a wireless card with the communication link conditions A.

[0004] The communication link conditions said here are a "received carrier frequency", a "transmitted carrier frequency", and a "transceiver communication link baud rate."

[0005] However, making a reader writer according to the communication link conditions of each wireless card has very bad development effectiveness. Moreover, although making a reader writer with other completely equivalent functions only from only communication link conditions differing by the class of a wireless card did not have a problem technically, the effort serious in development effectiveness and a maintenance side occurred, and there was a problem that effectiveness worsened.

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EFFECT OF THE INVENTION

[Effect of the Invention] As explained in full detail above, according to this invention, the versatility corresponding to various communication link conditions can be given, and the communication link conditioning approach of a reader writer and a reader writer which can raise development effectiveness and the effectiveness of a maintenance can be offered.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Although making a reader writer according to the communication link conditions of each wireless card had very bad development effectiveness and it did not have a problem technically that only communication link conditions only differ and other functions completely make an equivalent reader writer by the class of a wireless card as described above, the effort serious in development

effectiveness and a maintenance side occurred, and there was a problem that effectiveness worsened.

[0007] Then, this invention gives the versatility corresponding to various communication link conditions, and aims at offering the communication link conditioning approach of a reader writer and a reader writer which can raise development effectiveness and the effectiveness of a maintenance.

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MEANS

[Means for Solving the Problem] In a reader writer with the controlling element as which the reader writer of this invention determines a reference clock value, a transmitted carrier frequency, a received carrier frequency, and a communication link baud rate clock value A dividing means to carry out dividing of the clock inputted from the outside, and to generate a reference clock, A transmitting carrier generation means to generate a transmitting carrier by the reference clock generated with this dividing means, A receiving carrier generation means to generate a receiving carrier by the reference clock generated with the above-mentioned dividing means, A communication link baud rate generated with the above-mentioned controlling means, The reference clock value determined by the above-mentioned controlling element, a transmitted carrier frequency, a received carrier frequency, Receive the information on a communication link baud rate clock value, and the reference clock value generated with the above-mentioned dividing means based on this received

which generates the above-mentioned communication link baud rate clock value as value which generates the above-mentioned received carrier frequency as the transmitting carrier generation means. It consists of setting means to set the dividing above-mentioned transmitted carrier frequency is set as the above-mentioned above-mentioned dividing means. The dividing value which generates the and generates the above-mentioned reference clock value is set as the data of a communication link baud rate clock value, decodes this received serial data determined by the above-mentioned controlling element, a transmitted carrier and to generate a communication link baud rate clock. The reference clock value dividing of the reference clock generated with the above-mentioned dividing means, receiving carrier, A communication link baud rate generation means to carry out clock generated with the above-mentioned dividing means, and to generate a carrier, A receiving carrier generation means to carry out dividing of the reference reference clock generated with this dividing means, and to generate a transmitting reference clock, A transmitting carrier generation means to carry out dividing of the means to carry out dividing of the clock inputted from the outside, and to generate a received carrier frequency, and a communication link baud rate clock value A dividing value generated with the above-mentioned communication link baud rate generation receiving carrier generation means, and to set the communication link baud rate clock above-mentioned receiving carrier generation means as the above-mentioned setting means to set the received carrier frequency generated with the is set as the above-mentioned transmitting carrier generation means. It consists of invention specifies the identification information given to two or more communication [0010] In a reader writer with the controlling element which the reader writer of this the above-mentioned communication link baud rate generation means. above-mentioned receiving carrier generation means, and to set the dividing value frequency, a received carrier frequency, The dividing value which receives the serial this invention determines a reference clock value, a transmitted carrier frequency, a means as the above-mentioned communication link baud rate generation means. frequency generated with the above-mentioned transmitting carrier generation means carrier by the reference clock generated with this dividing means, A receiving carrier reference clock, A transmitting carrier generation means to generate a transmitting means to carry out dividing of the clock inputted from the outside, and to generate a link condition information, and determines communication link conditions A dividing [0009] In a reader writer with the controlling element as which the reader writer of information is set as the above-mentioned dividing means. The transmitted carrier

a communication link baud rate clock value are memorized beforehand, Receive the communication link baud rate clock, A reference clock value, a transmitted carrier generated with this dividing means, and to generate a transmitting carrier, A receiving dividing of the clock inputted from the outside, and to generate a reference clock, A or more communication link condition information A dividing means to carry out above-mentioned communication link baud rate generation means as the to set the received carrier frequency generated with the above-mentioned receiving above-mentioned transmitting carrier generation means. It consists of setting means the above-mentioned transmitting carrier generation means is set as the reference clock value generated with the above-mentioned dividing means as storage means is searched using this identification information that received. The determined by the above-mentioned controlling element, and the above-mentioned communication link baud rate clock value is memorized beforehand; Receive the information was given to communication link condition information including a transmitted carrier frequency, a received carrier frequency, and a storage means by clock generated with the above-mentioned dividing means, and to generate a the above-mentioned dividing means, and to generate a receiving carrier, A carrier generation means to carry out dividing of the reference clock generated with transmitting carrier generation means to carry out dividing of the reference clock identification information by which the reader writer of this invention was given to two [0011] In a reader writer with the controlling element which determines the above-mentioned communication link baud rate generation means. and to set the communication link baud rate clock value generated with the carrier generation means as the above-mentioned receiving carrier generation means above-mentioned dividing means. The transmitted carrier frequency generated with communication link condition information retrieved and called is set as the identification information which specifies the communication link conditions which two or more communication link condition information that identification generated with the above-mentioned dividing means, A reference clock value, a means to generate a communication link baud rate clock by the reference clock communication link condition information including the dividing value which generates communication link conditions that identification information was given to frequency, a received carrier frequency, and a storage means by which two or more communication link baud rate generation means to carry out dividing of the reference with the above-mentioned dividing means, A communication link baud rate generation generation means to generate a receiving carrier by the reference clock generated

identification information which specifies the communication link conditions determined by the above-mentioned controlling element, and the above-mentioned storage means is searched using this identification information that received. The dividing value which generates the reference clock value as communication link condition information retrieved and called is set as the above-mentioned dividing means. The dividing value which generates a transmitted carrier frequency is set as the above-mentioned transmitting carrier generation means. It consists of setting means to set the dividing value which generates a received carrier frequency as the above-mentioned receiving carrier generation means, and to set the dividing value which generates a communication link baud rate clock value as the above-mentioned communication link baud rate generation means.

set up with this setting means, The communication link baud rate clock generated with carrier generated with the above-mentioned transmitting carrier generation means above-mentioned communication link baud rate generation means, The transmitting above-mentioned communication link baud rate generation means as the and to set the communication link baud rate clock value generated with the carrier generation means as the above-mentioned receiving carrier generation means, to set the received carrier frequency generated with the above-mentioned receiving is set as the above-mentioned transmitting carrier generation means. A setting means frequency generated with the above-mentioned transmitting carrier generation means information is set as the above-mentioned dividing means. The transmitted carrier value generated with the above-mentioned dividing means based on this received information on a communication link baud rate clock value, and the reference clock element, a transmitted carrier frequency, a received carrier frequency, Receive the means. The reference clock value determined by the above-mentioned controlling baud rate clock by the reference clock generated with the above-mentioned dividing communication link baud rate generation means to generate a communication link carrier by the reference clock generated with the above-mentioned dividing means, A with this dividing means, A receiving carrier generation means to generate a receiving generation means to generate a transmitting carrier by the reference clock generated inputted from the outside, and to generate a reference clock, A transmitting carrier performs a wireless card and radio A dividing means to carry out dividing of the clock received carrier frequency, and a communication link baud rate clock value, and element which determines a reference clock value, a transmitted carrier frequency, a the above-mentioned communication link baud rate generation means, and a [0012] In the reader writer which the reader writer of this invention has the controlling

frequency, a received carrier frequency, and a communication link baud rate clock communication link baud rate clock value which carries out generation frequency which carries out generation, and sets up the above-mentioned by consisting of a step which sets up the above-mentioned transmitted carrier baud rate clock by the above-mentioned reference clock. The reference clock value value. The step which carries out dividing of the clock inputted from the outside, and controlling element which determines a reference clock value, a transmitted carrier transmission-control means, and control data processing to the above-mentioned generated with the above-mentioned communication link baud rate generation means generated with the above-mentioned receiving carrier generation means set up with which carries out dividing of the above-mentioned reference clock, and generates a clock, and generates a transmitting carrier, and the step which carries out dividing of generates a reference clock, The step which carries out dividing of this reference value. The step which carries out dividing of the clock inputted from the outside, and controlling element which determines a reference clock value, a transmitted carrier invention It is the communication link conditioning approach of a reader writer with the carries out generation is set up based on this received information. It is characterized link baud rate clock value, and the above-mentioned reference clock value which frequency, a received carrier frequency, Receive the information on a communication determined by the above-mentioned controlling element, a transmitted carrier above-mentioned reference clock, The step which generates a communication link reference clock, and the step which generates a receiving carrier by the generates a reference clock, The step which generates a transmitting carrier by this frequency, a received carrier frequency, and a communication link baud rate clock invention It is the communication link conditioning approach of a reader writer with the [0013] The communication link conditioning approach of the reader writer this data processing to the above-mentioned transmit data to the above-mentioned and the above-mentioned wireless card, It consists of control means which control data from the received data received from the communication link baud rate clock the above-mentioned setting means, A reception-control means to generate recovery transmitted from the above-mentioned controlling element, The receiving carrier the above-mentioned reference clock, and generates a receiving carrier, The step [0014] The communication link conditioning approach of the reader writer this frequency which carries out generation, sets up the above-mentioned received carrier recovery data to the above-mentioned reception-control means. transmission-control means to generate modulation data from the transmit data

carrier frequency. The dividing value which receives the serial data of a carries out setting up the above-mentioned reference clock value which is included in information that received, and communication link condition information is called. It information which is carrying out [above-mentioned] storage using this identification determined by the above-mentioned controlling element, search the identification received carrier frequency, and a communication link baud rate clock value, Receive information including a reference clock value, a transmitted carrier frequency, a information that identification information was given to communication link condition step which memorizes beforehand two or more communication link condition communication link baud rate clock by the above-mentioned reference clock, The carrier by the above-mentioned reference clock. The step which generates a transmitting carrier by this reference clock, and the step which generates a receiving from the outside, and generates a reference clock, The step which generates a condition information, and determines communication link conditions, and is inputted specifies the identification information given to two or more communication link link conditioning approach of a reader writer with the controlling element which invention The step which carries out dividing of the clock which is the communication [0015] The communication link conditioning approach of the reader writer this value which generates the above-mentioned communication link baud rate clock value generates the above-mentioned received carrier frequency, and sets up the dividing above-mentioned transmitted carrier frequency, sets up the dividing value which consisting of a step which sets up the dividing value which generates the generates the above–mentioned reference clock value is set up. It is characterized by communication link baud rate clock value, decodes this received Syria ** data, and above-mentioned controlling element, a transmitted carrier frequency, a received communication link baud rate clock, The reference clock value determined by the communication link baud rate clock value which carries out generation as the generation, setting up the above-mentioned received carrier frequency which carries setting up the above-mentioned transmitted carrier frequency which carries out this communication link condition information and which carries out generation, the identification information which specifies the communication link conditions out generation, and becoming from the step set up about the above-mentioned

[0016] The communication link conditioning approach of the reader writer this invention The step which carries out dividing of the clock which is the communication link conditioning approach of a reader writer with the controlling element which

above-mentioned controlling element, a transmitted carrier frequency, a received wireless card and radio, and is inputted from the outside, and generates a reference generates a communication link baud rate clock value. which generates a transmitted carrier frequency, sets up the dividing value which characterized by consisting of a step which sets up the dividing value which generates communication link condition information is called. this connoisseur -- it is [above-mentioned] storage using this identification information that received, and element, search the identification information which is carrying out communication link conditions determined by the above-mentioned controlling baud rate clock value, Receive the identification information which specifies the rate clock. The step which memorizes beforehand two or more communication link of the above-mentioned reference clock, and generates a communication link baud transmitting carrier, and the step which carries out dividing of the above-mentioned clock, The step which carries out dividing of this reference clock, and generates a carrier frequency, Receive the information on a communication link baud rate clock communication link conditioning approach of the reader writer which performs a baud rate clock value. The step which carries out dividing of the clock which is the transmitted carrier frequency, a received carrier frequency, and a communication link invention It has the controlling element which determines a reference clock value, a [0017] The communication link conditioning approach of the reader writer this generates a received carrier frequency, and sets up the dividing value which the reference clock value included in principle *****, sets up the dividing value transmitted carrier frequency, a received carrier frequency, and a communication link information including the dividing value which generates a reference clock value, a conditions that identification information was given to communication link condition reference clock, and generates a receiving carrier, The step which carries out dividing condition information, and is inputted from the outside, and generates a reference set up based on this received information. The step which sets up the value, and the above-mentioned reference clock value which carries out generation is step which generates a receiving carrier by the above-mentioned reference clock, clock, The step which generates a transmitting carrier by this reference clock, and the determines the identification information given to two or more communication link the above-mentioned received carrier frequency which carries out generation, and above-mentioned transmitted carrier frequency which carries out generation, sets up above-mentioned reference clock, The reference clock value determined by the The step which generates a communication link baud rate clock by the

modulation data from the transmit data transmitted from the above-mentioned which a setup was carried out [above-mentioned]. The step which generates link baud rate clock generated with the communication link baud rate clock value by out generation. The transmitting carrier generated by the transmitted carrier data processing to the above-mentioned recovery data. which controls data processing to the above-mentioned transmit data, and controls and the above-mentioned wireless card, It is characterized by consisting of a step clock generated with the above-mentioned communication link baud rate clock value, which a setup was carried out [above-mentioned], the communication link baud rate received from the receiving carrier generated by the received carrier frequency by controlling element. The step which generates recovery data from the received data frequency by which a setup was carried out [above-mentioned], the communication sets up the above-mentioned communication link baud rate clock value which carries

invention is explained with reference to a drawing. [Embodiment of the Invention] Hereafter, the gestalt of 1 implementation of this

system concerning this invention. [0019] <u>Drawing 1</u> shows the outline configuration of the wireless card processing

this PC1, and this reader writer 2. order equipment, and the artenna section 3 of the reader writer (R/W) 2 connected to card 4 which performs radio, and — between the personal computer (PC) 1 as high [0020] That is, the wireless card processing system is constituted by the wireless (IC)

unit, the display, and the connection of the reader writer 2. [0021] PC1 is constituted by the control section which is not illustrated, the control

input-clock frequency divider 21. writers as an interface, the transceiver circuit 7, the antenna section 3, and the element) which controls the whole reader writer 2, LSI6 for the wireless card reader [0022] The reader writer 2 is constituted by MPU5 as a control circuit (controlling

communication link with the memory 12 and LSI6 which consist of RAM and a ROM various ****, and is constituted by S1013 the input of the serial data for the [0023] MPU5 memorizes CPU11 which controls whole MPU5, a control program, and

data (SO), the I/O Port for serial clocks (SCK), and the I/O Port for control signals [0025] The I/O Port the I/O Port of ** and for the serial input (data SI) serial output transmits a data lead command to LSI6 to reception of a data lead command. [0024] It connects with the above PC 1, an exchange of data is performed, and CPU11

(CONT) are formed in the above S1013.

Port for SI -- mustard -- it outputs to SI6 [0026] the above S1013 — the data lead command of the wireless card 4 — the I/O

[0027] The antenna section 3 is constituted by the transmitting antenna 14 and the

circuit 16 and the receiving circuit 17. [0028] The above-mentioned transceiver circuit 7 is constituted by the sending receiving antenna 15.

random number, and ID (recognition number) data, the modulation demodulator circuit information, such as a control circuit which controls the whole, a control program, a [0029] The wireless card 4 is constituted by the memory which memorizes various

circuit 23, the receiving carrier generation circuit 24, a communication link baud rate the power-source generating circuit, and the transceiver antenna. reception-control circuit (demodulator circuit) 27. generation circuit 25, a transmission-control circuit (modulation circuit) 26, and a input-clock frequency divider 21, MPUI/F22, the transmitting carrier generation [0030] Drawing 2 shows the outline configuration of LS16. LS16 consists of the

invention can be made into that more flexible by establishing the dividing value of 1/1 system. For example, the function of the general-purpose reader writer by this inputted into the reader writer 2, and generates the clock used as the criteria of a [0031] The input-clock frequency divider 21 carries out dividing of the external clock / 1.5, 1/2, and a 1 / 4 grades. [1 and 1]

transmitting carrier generation circuit 23, the receiving carrier generation circuit 24 through the serial terminal of MPU5. By receiving and decoding the serial data from [0032] The MPUI/F circuit 22 is an interface (I/F) circuit for software to perform and the communication link baud rate generation circuit 25 is set up. MPU5, each register of the above-mentioned input-clock frequency divider 21, the generation circuit 24, and the communication link baud rate generation circuit 25 divider 21, the transmitting carrier generation circuit 23, the receiving carrier automatically a setup of each register of the above-mentioned input-clock frequency

input-clock frequency divider 21. It realizes by carrying out dividing of the reference carrier frequency to the wireless card 4 from the reference clock generated in the clock to any value. [0033] The transmitting carrier generation circuit 23 is for setting up the transmitted

generated in the input-clock frequency divider 21. It realizes by carrying out dividing frequency of the received data from the wireless card 4 from the reference clock [0034] The receiving carrier generation circuit 24 is for setting up the received carrier

of the reference clock to any value.

[0035] The communication link baud rate generation circuit 25 is for setting up a communication link baud rate clock (one 16 times the frequency of a baud rate) with the wireless card 4 from the reference clock generated in the input-clock frequency divider 21. It realizes by carrying out dividing of the reference clock to any value. [0036] The transmission-control circuit 26 is a circuit which generates the modulation data to the wireless card 4 with the transmitting carrier generated in the transmitting carrier generation circuit 23, the communication link baud rate generation circuit 25, and the transmit data from the MPUI/F circuit 22.

[0037] The reception-control circuit 27 is a circuit which generates the recovery data to MPU5 with the received data from the wireless card 4, the receiving carrier generated in the receiving carrier generation circuit 24, and the communication link baud rate clock generated in the communication link baud rate generation circuit 25. [0038] Next, in such a configuration, actuation of the reader writer 2 is explained with reference to the flow chart of drawing 3.

[0039] When a power source is switched on (ST1), the MPUI/F circuit 22 judges the initial communicate mode as a communications protocol with MPU5 (ST2).

[0040] According to this judgment, the MPUL/F circuit 22 receives communication link condition information through serial communication from MPU5. Decode the received communication link condition information and the dividing value of the input-clock frequency divider 21 is set up based on this decoded communication link condition (ST3). The transmitted carrier frequency of the transmitting carrier generation circuit 23 is set up (ST4), the received carrier frequency of the receiving carrier generation circuit 24 is set up (ST5), and the communication link baud rate of the communication link baud rate generation circuit 25 is set up (ST6).

[0041] And from MPU5, the MPUI/F circuit 22 receives the information on the other modes through serial communication, sets up the other modes (ST7), confirms all setup (ST8), and starts the communication link with the wireless card 4 (ST22).

[0042] Communication link conditions with the wireless card 4 are set up by the routine of the step 3-STs 6 mentioned above. However, this order of a setup does not ask. These setup is automatically performed after powering on by the software memorized by the memory 12 of MPU5 using serial I/F of MPU5.

[0043] Next, the 1st example in the reader writer 2 constituted concretely is explained with reference to $\frac{drawing\ 4}{}$. A setup of the reader writer 2 for enabling the communication link with the wireless card 4 which operates on the following

communication link conditions is as follows.

[0044] communication link condition input-clock frequency: — 16MHz transmitted carrier frequency: — 125kHz received carrier frequency: — 62.5kHz communication link baud rate: — 7800 bpsMPUI/F circuits 22 follow the flow shown by <u>drawing 3</u>, and set up the reader writer 2. First, in setting up each register in a step 3-STs 6, MPU5 decides what kind of value to set up beforehand.

[0045] Then, it receives through serial communication from MPU5, and the MPUI/F circuit 22 sets up the value determined here to each register of the input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit 24, and the communication link baud rate generation circuit 24.

[0046] A setup of each register to communication link conditions here is as follows. [0047] a. Set the input-clock dividing value of the input-clock frequency divider 21 as one half, and generate the reference clock (8MHz) used as the base of actuation of the reader writer 2 from an input clock (16MHz).

[0048] b. In order to generate the transmitted carrier frequency (125kHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the transmitting carrier generation circuit 23 as 1/64.

[0049] c. In order to generate the received carrier frequency (62.5kHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the receiving carrier generation circuit 24 as 1/128.

[0050] d. In order to set up the communication link baud rate (7800bps) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the communication link baud rate generation circuit 25 as 1/64. The clock generated here is 16 times the frequency of a baud rate.

[0051] Thus, by setting up, the communication link with the wireless card 4 equipped with the above-mentioned communication link conditions is attained. However, the order of a setup of a, b, c, and d does not ask. Moreover, the set point (dividing value) of each register shown here is an example, and must not necessarily be set up in this way to the above-mentioned communication link conditions. A system construction person can specify the set point of each register as arbitration.

[0052] Next, the 2nd example in the reader writer 2 constituted concretely is explained with reference to $\underline{\text{drawing 5}}$. An input clock is changed into 8MHz to the communication link conditions shown by $\underline{\text{drawing 4}}$, and other conditions are the same as $\underline{\text{drawing 4}}$.

0053] The MPUI/F circuit 22 follows the flow shown by drawing 3, and sets up the

eader writer 2.

[0054] a. Set the input-clock dividing value of the input-clock frequency divider 21 as 1/1, and generate the reference clock (8MHz) used as the base of actuation of the reader writer 2 from an input clock (8MHz). In addition, about the dividing value of the b. transmitting carrier generation circuit 23, the dividing value of the c. receiving carrier generation circuit 24, and the dividing value of d. communication link baud rate generation circuit 25, it is the same as drawing 4.

[0055] Thus, by setting up, the communication link with the wireless card 4 equipped with the above-mentioned communication link conditions is attained. However, the order of a setup of Above a, b, c, and d does not ask. Moreover, the set point (dividing value) of each register shown here is an example, and must not necessarily be set up in this way to the above-mentioned communication link conditions. A system construction person can specify the set point of each register as arbitration. [0056] Next, the 3rd example in the reader writer 2 constituted concretely is explained with reference to drawing 6. A setup of the reader writer 2 for enabling the communication link with the wireless card 4 which operates on the following communication link conditions is as follows.

[0057] communication link condition input-clock frequency: — 13.56MHz transmitted carrier frequency: — 3.322MHz received carrier frequency: — 847.5kHz communication link baud rate: — 106 kbpsMPUI/F circuits 22 follow the flow shown by drawing 3, and set up the reader writer 2. First, in setting up each register in a step 3-STs 6, MPU5 decides what kind of value to set up beforehand.

[0058] Then, it receives through serial communication from MPU5, and the MPU1/F circuit 22 sets up the value determined here to each register of the input-clock frequency divider 21, the transmitting carrier generation circuit 23, the receiving carrier generation circuit 24, and the communication link baud rate generation circuit

[0059] A setup of each register to communication link conditions here is as follows. [0060] a. Set the input-clock dividing value of the input-clock frequency divider 21 as 1/1, and generate the reference clock (13.56MHz) used as the base of actuation of a reader writer from an input clock (13.56MHz).

[0061] b. In order to generate the transmitted carrier frequency (3.322MHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing value of the transmitting carrier generation circuit 23 as one fourth.

[0062] c. In order to generate the received carrier frequency (9.47 5kHz) to the

[0062] c. In order to generate the received carrier frequency (847.5kHz) to the reference clock generated in the input-clock frequency divider 21, set the dividing

value of the receiving carrier generation circuit 24 as 1/16.

[0063] d. In order to set up the communication link baud rate to the reference clock generated in the input-clock frequency divider 21 (106kbps), set the dividing value of the communication link baud rate generation circuit 25 as one eighth. The clock generated here is 16 times the frequency of a baud rate.

[0064] Thus, by setting up, the communication link with the wireless card 4 equipped with the above-mentioned communication link conditions is attained. However, the order of a setup of a, b, c, and d does not ask moreover, the set point (dividing value) of each register shown here is an example, and is not necessarily set up in this way to the above-mentioned communication link conditions — it can kick, and if it is **, there is not necessarily nothing. A system construction person can specify the set point of each register as arbitration.

[0065] Next, the 4th example adapting the configuration in the reader writer 2 is explained with reference to <u>drawing 7</u>. In this example, the communication link conditioning data storage memory 28 is prepared as an additional function.
[0066] In order to confirm the reader writer 2 to the wireless card 4 which is operating by the radical of some communication link conditions as shown above, it is necessary to set up each setting register of a step 3-STs 6 from MPU5. Although the register is accessed and set up according to an individual, respectively, now, processing occurs repeatedly and it becomes complicated.

[0067] So, in this example, the communication link conditioning data storage memory 10 which made these setting information memorize beforehand is prepared, and it specifies which [of memory information] MPU5 confirms. The MPUI/F circuit 22 sets up a communication link condition register automatically from the specified memory information.

[0068] Here, processing actuation of **** 4 example is explained with reference to the flow chart of $\frac{1}{2}$ drawing 8.

[0069] When a power source is switched on (ST11), the MPUI/F circuit 22 judges the initial communicate mode as a communications protocol with MPU5 (ST12).

[0070] According to assignment of which [of the memory information from MPU5] the MPUI/F circuit 22 confirms, memory information is called from the communication link conditioning data storage memory 28 (ST13). Decode the contents of this memory information (ST14), and the dividing value of the input-clock frequency divider 21 is set up based on this decoded communication link conditioning data (ST15). The transmitted carrier frequency of the transmitting carrier generation circuit 23 is set

up (ST16), the received carrier frequency of the receiving carrier generation circuit 24

is set up (ST17), and the communication link baud rate of the communication link baud rate generation circuit 25 is set up (ST18).

[0071] And from MPU5, the MPUI/F circuit 22 sets up the other modes through serial communication (ST19), confirms all setup (ST20), and starts the communication link with the wireless card 4 (ST21).

[0072] <u>Drawing 9</u> is the example of a configuration of the memory information stored in the communication link conditioning data storage memory 28. For example, when a specification is in ISO10xxx mode, the address is set up with the 00th street and the function (register set point) is set up with input clocks 1/1, the transmitting carriers 1/16, and baud rates 1/32.

[0073] In the example of a configuration of this memory information, register setting information is arranged in the communication link conditioning data storage memory 28 for every functional specifications. When making it a setup corresponding to ISO10xxx mode, MPU5 can set up the reader writer 2 by [of the communication link conditioning data storage memory 28] confirming the 00th street.

[0074] <u>Drawing 10</u> is other examples of a configuration of the memory information stored in the communication link conditioning data storage memory 28. For example, in the case of input-clock:16MHz, transmitting carrier:125kHz, receiving carrier:62.5kHz, and communication link baud rate:7800bps, the address is set up with the 00th street and the function (register set point) is set up for the specification with input clocks 1/2, the transmitting carriers 1/64, the receiving carriers 1/128, and baud rates 1/64. [0075] In the example of a configuration of this memory information, register setting information is arranged in the communication link conditions, For example, by setting the communication link conditions shown by <u>drawing 4</u> as the 00th street of the communication link conditioning data storage memory 28, if the 00th street is confirmed, a setup of the reader writer 2 will become the thing corresponding to this storage memory 10 from MPU5.

[0076] Next, the 5th example is explained with reference to drawing 11

[0077] The differences with <u>drawing 2</u> in **** 5 example are the transmission-control circuit 31 and the reception-control circuit 32.

[0078] The transmission-control circuit (modulation circuit) 31 is a circuit which generates the modulation data to the wireless card 4 with the transmitting carrier generated in the transmitting carrier generation circuit 23, the communication link baud rate clock generated in the communication link baud rate generation circuit 25

and the transmit data from the MPUI/F circuit 22. Moreover, the existence of data processing is controllable by the data-processing control signal from the MPUI/F circuit 22 to transmit data.

[0079] Specifically, it is addition of 1 synchronous character data. At this time, the character value and character length of a synchronous character can specify it as arbitration from MPU5 separately.

[0080] 2) Addition of CRC operation data

[0081] 3) Addition of a frame start character / frame termination character. Addition of a frame start/termination character can be specified according to an individual. [0082] It has ******.

[0083] The reception-control circuit (demodulator circuit) 32 is a circuit which generates the recovery data to MPU5 with the received data from the wireless card 4, the receiving carrier generated in the receiving carrier generation circuit 24, and the communication link baud rate clock generated in the communication link baud rate generation circuit 25. Moreover, the existence of processing of data is controllable by the data-processing control signal from the MPUI/F circuit 22 to recovery data. [0084] Specifically, it is deletion of 1 synchronous character data. At this time, the character value and character length of a synchronous character can specify it as arbitration from MPU5 separately.

[0085] 2) CRC operation acknowledgement function (error detection function).

[0086] 3) Deletion of a frame start character / frame termination character. Deletion of a frame start/termination character can be specified according to an individual. [0087] It has ******.

[0088] <u>Drawing 12</u> is the example of transmit data processing by the data-processing control signal in the transmission-control circuit 31. The radical data shown in (a) of <u>drawing 12</u> are serial data transmitted from MPU5, and are these data which should be transmitted to the wireless card 4. Hereafter, six sorts of examples are shown and processing of the data to this radical data is explained. It is the example which is shown here to the last, and it is not what showed all realizable combination.

[0089] (b) shows the condition of the transmit data in the case of adding 1 byte of synchronous character. The synchronous character is added to the head of radical data. For example, the character of 92H is added.

[0090] (c) shows the condition of the transmit data in the case of adding 2 bytes of synchronous character. The synchronous character is added to the head of radical data. For example, the character of 9292H is added.

[0091] (d) shows the condition of the transmit data in the case of adding a CRC

operation. The CRC operation was performed to radical data and the result of an operation is added after the last data transmission of these data. For example, when calculating CRC16, the result of an operation is added to 16 bits.

[0092] (e) shows the condition of the transmit data in the case of adding an initiation frame (SOF) / termination frame (EOF) before and after radical data, respectively. For example, the "High level" of a triplet can be added from the "Low level" of 10 to 11 bits, and 2 as SOF. Moreover, the "Low level" of 10 to 11 bits can be added as EOF. [0093] (f) shows the condition of the transmit data in the case of adding an initiation frame (SOF) to the anterior part of radical data.

[0094] (g) shows the condition of the transmit data in the case of adding a termination frame (EOF) to the posterior part of radical data.

[0095] Processing of the recovery data based on the data-processing control signal in the reception-control circuit 32 performs the reverse of transmit data processing shown in (b) – (g) of <u>drawing 12</u>. For example, the recovery data which deleted only the synchronous character from the recovery data with which the synchronous character from the recovery data with which the synchronous character was added to the head are generated, and it transmits as serial data to MPU5 (radical data are generated from the data of (b) of <u>drawing 12</u>).

[0096] As explained above, according to the gestalt of implementation of the above-mentioned invention, the general-purpose reader writer corresponding to a wireless card with various communication link conditions (an input-clock frequency, a received carrier frequency, a transmitted carrier frequency, transceiver communication link baud rate) is realizable.

[0097] Moreover, by using a reader writer widely, the need of manufacturing the reader writer system corresponding to each wireless card according to an individual is lost, and development effectiveness and the effectiveness of a maintenance improve. [0098] Moreover, a functional setting register can be performed through serial I/F of MPU, and since it has realized without adding an extraordinarily difficult function, it can master easily only by getting to know the fundamental operating instructions of MPU.

[0099] In addition, it becomes possible from MPU by storing information in memory also about each setting command about processing control of a transmitted and received data to set up automatically.

[Translation done.]

* NOTICES *

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1. This document has been translated by computer. So the translation may not reflect the original precisely.

2.*** shows the word which can not be translated

In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The block diagram showing the outline configuration of the wireless card processing system concerning this invention.

<u>Drawing 2</u> The block diagram showing the outline configuration of a reader writer.

Drawing 3] The flow chart for explaining actuation of a reader writer.

<u>Drawing 4</u>] Drawing showing the configuration of the 1st concrete example in a eader writer.

<u>Drawing 5]</u> Drawing showing the configuration of the 2nd concrete example in a reader writer.

Drawing 6] Drawing showing the configuration of the 3rd concrete example in a reader writer.

<u>[Drawing 7]</u> Drawing showing the 4th example adapting the configuration in a reader writer.

Drawing 8] The flow chart for explaining processing actuation of a reader writer.

[Drawing 9] Drawing showing the example of a configuration of the memory information stored in communication link conditioning data storage memory.

[Drawing 10] Drawing showing the example of a configuration of memory **** stored in communication link conditioning data storage memory.

[Drawing 11] Drawing showing the configuration of the 5th example of a reader writer.
[Drawing 12] Drawing showing the example of transmit data processing by the

[Description of Notations]

data-processing control signal in a transmission-control circuit

- 1 --- High order equipment (PC)
- 2 Reader writer
- 4 -- Wireless card

- 5 -- MPU (controlling element)
- 6 -- LSI for wireless card reader writers
- 7 Transceiver circuit
- 21 Input-clock frequency divider (dividing means)
- 22 MPUI/F (setting means)
- 23 Transmitting carrier generation circuit (transmitting carrier generation means)
- 24 Receiving carrier generation circuit (receiving carrier generation means)
- 25 -- Communication link baud rate generation circuit (communication link baud rate generation means)
- 26 31 Transmission-control circuit (transmission-control means)
- 27 32 -- Reception-control circuit (reception-control means)
- 28 Communication link conditioning data storage memory (storage means)

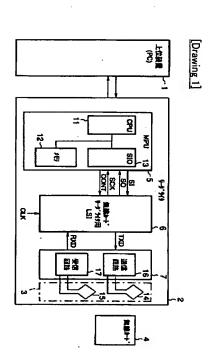
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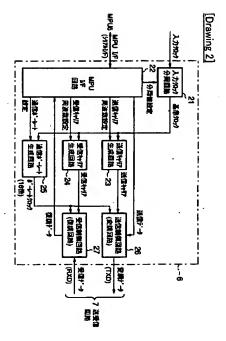
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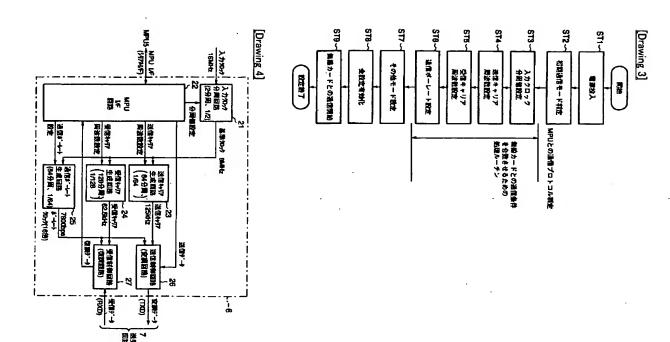
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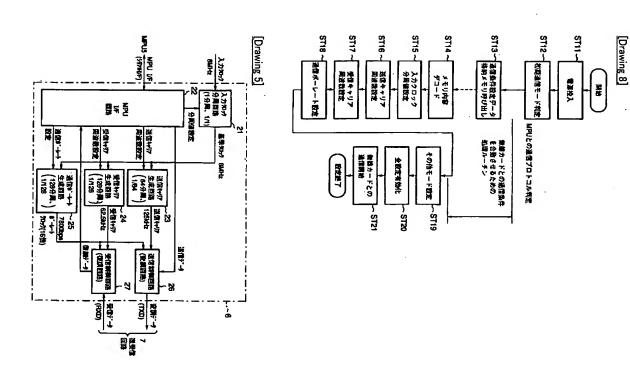
- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.*** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

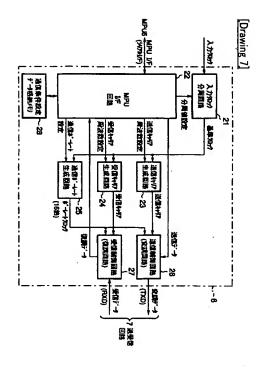
DRAWINGS

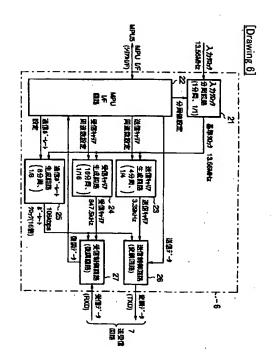








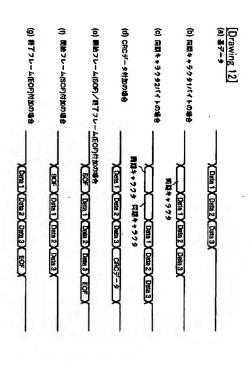


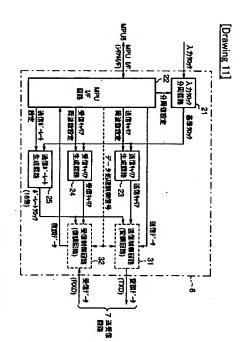


	入力クロック :13.56MHz 送信キャリア :3.39MHz 受信キャリア :847.56Hz 通信がーレート:105kbps	入力クロック : BMHz 送信キャリア : 12GHz 受信キャリア : 82.5Hz 送信はーレート : 7800bps	入力クロック :16Mbz 送信キャリア :125kHz 受信キャリア :62.5kHz 通信ボーレート:7800bps	仕事	Drawing 10
	==	. 01	00	アドレス	
••••••	入3000ック 1/1 総局キャンア 1/4 単記キャンア 1/16 メーフート 1/8	入ガクロック 1/1 説面キャリア 1/84 収録キャリア 1/128 ポーワート 1/84	入力クロック 1/1 総団キャリア 1/64 保団キャリア 1/128 ボーレート 1/64	価値(レジスタ設定値)	

	B社向け モード	A社向け モード2	A社向け モード 1	180 14xxx	180 10ccm	计数	[Drawing 9]
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[Translation done.]





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(19)日本国特許庁 (JP)

3 Þ 噩 称罕公典(Y)

(11)特許出關公開番号

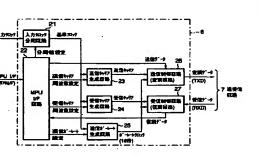
特期2001-126038 (P2001 – 126038A)

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(54) 「発用の名称] リーダライタとリーダライタの通信条件設定方法

ック分周回路21の分周値を設定し、送信キャリア生成 せ、開発効率およびメンテナンスの効率を向上させる。 ードし、このデコードした通信条件に基づいて入力クロ て通信条件情報を受信し、受信した通信条件情報をデコ モードの判定を行い、MPU5よりシリアル通信を介し **報を受信し、その他のモードを設定し、全設定を有効に** MPU 5 よりシリアル通信を介してその他のモードの信 回路23の送信キャリア周波数字般定し、受信キャリア 2 2は、MPU5との通信プロトコルとしての初期通信 ±成回路24の受信キャリア周波数を設定し、通信ボー 【課題】 さまざまな通信条件に対応する汎用性を持け **、て無線カードとの通信を開始する.** /一下生成回路25の通信ボーフートを設定し、さらに 電源が投入された際、MPUI/F回路



成する通信ボーレートクロック値を上記通信ボーレート 受信し、この受信した情報に基づいて上記分周手段で生 信キャリア周波数、通信ボーレートクロック値の情報を 分周手段と、この分周手段で生成された基準クロックに する制御素子を有したリーダライタにおいて、外部から 受信キャリア周波数、通信ボーレートクロック値を決定 とするリーダライタ。 生成手段に設定する設定手段と、を具備したことを特徴 成手段で生成する受信キャリア周波数を上記受信キャリ 信キャリア生成手段で生成する送信キャリア周波数を上 成する基準クロック値を上記分周手段に設定し、上記送 で決定された基準クロック値、送信キャリア周波数、受 **クを生成する通信ボーレート生成手段と、上記制御素子** で生成された基準クロックにより通信ボーレートクロッ リアを生成する受信キャリア生成手段と、上紀分周手段 上記分周手段で生成された基準クロックにより受信キャ より送信キャリアを生成する送信キャリア生成手段と、 入力されるクロックを分周して基準クロックを生成する ア生成手段に設定し、上記通信ボーレート生成手段で生 紀送信キャリア生成手段に散定し、上記受信キャリア生 【請求項1】 基準クロック値、送信キャリア周波数

する設定手段と、を具備したことを特徴とするリーダラ 記受信キャリア周波数を生成する分周値を上記受信キャ ク値のシリアルデータを受信し、この受信したシリアル ア周波数、受信キャリア周波数、通信ボーレートクロッ 分周手段で生成された基準クロックを分周して通信ボー 分周して送信キャリアを生成する送信キャリア生成手段 分周手段と、この分周手段で生成された基準クロックを する制御菜子を有したリーダライタにおいて、外部から 受信キャリア周波数、通信ボーレートクロック値を決定 を生成する分周値を上記通信ボーレート生成手段に設定 リア生成手段に殷定し、上記通信ボーレートクロック値 成する分周値を上記送信キャリア生成手段に設定し、上 を上記分周手段に設定し、上記送信キャリア周波数を生 受信キャリアを生成する受信キャリア生成手段と、上記 データを解読して上記基準クロック値を生成する分周値 上記制御素子で決定された基準クロック値、送信キャリ レートクロックを生成する通信ボーレート生成手段と、 入力されるクロックを分周して基準クロックを生成する 【請求項2】 ・基準クロック値、送信キャリア周波数、 上記分周手段で生成された基準クロックを分周して

基準クロックにより受信キャリアを生成する受信キャリ る送信キャリア生成手段と、上記分周手段で生成された で生成された基準クロックにより送信キャリアを生成す して基準クロックを生成する分周手段と、この分周手段 ダライタにおいて、外部から入力されるクロックを分周 報を指定して通信条件を決定する制御素子を有したリー 【請求項3】 複数の通信条件情報に付与された識別情

8

特間2001-126038

成手段に設定し、上記通信ボーレート生成手段で生成す 信キャリア生成手段に散定し、上記受信キャリア生成手 ャリア生成手段で生成する送信キャリア周波数を上記分 る基準クロック値を上記分周手段に設定し、上記送信さ 呼び出した通信条件情報としての上記分周手段で生成す された通信条件を指定する蹠別情報を受信し、この受信 通信条件情報に識別情報が付与された複数の通信条件情 受信キャリア周波数、通信ボーレートクロック値を含む により通信ボーレートクロックを生成する通信ボーレー ア生成手段と、上記分周手段で生成された基準クロック るリーダライタ。 手段に設定する設定手段と、を具備したことを特徴とす **る通信ボーレートクロック値を上記通信ボーレート生成** 段で生成する受信キャリア周波数を上記受信キャリア生 した鑑別情報を用いて上記記憶手段を検索し、検索して 根を予め記憶している記憶手段と、上記制御菜子で決気 ト生成手段と、基準クロック値、送信キャリア周波数

の受信した識別情報を用いて上記記憶手段を検索し、検 通信条件を予め記憶している記憶手段と、上記制御素子 生成する分周手段と、この分周手段で生成された基準ク 外部から入力されるクロックを分周して基準クロックを 報を決定する制御菜子を有したリーダライタにおいて、 ダライタ。 受信キャリア生成手段に設定し、通信ボーレートクロッ ア周波数を生成する分周値を上記送信キャリア生成手段 索して呼び出した通信条件情報としての基準クロック値 周値を含む通信条件情報に識別情報が付与された複数の ャリア周波数、通信ボーレートクロック値を生成する分 手段と、基準クロック値、送信キャリア周波数、受信キ 通信ボーレートクロックを生成する通信ボーレート生成 分周して受信キャリアを生成する受信キャリア生成手段 生成手段と、上配分周手段で生成された基準クロックを ロックを分周して送信キャリアを生成する送信キャリア ク値を生成する分周値を上記通信ボーレート生成手段に に設定し、受信キャリア周波数を生成する分周値を上記 を生成する分周値を上記分周手段に設定し、送信キャリ 設定する設定手段と、を具備したことを特徴とするリー で決定された通信条件を指定する識別情報を受信し、 【請求項4】 複数の通信条件情報に付与された識別情 、上配分周手段で生成された基準クロックを分周して

ន 周して基準クロックを生成する分周手段と、この分周手 段で生成された基準クロックにより送信キャリアを生成 する制御素子を有して、無線カードと無線通信を行うリ 受信キャリア周波数、通信ボーレートクロック値を決定 クにより通信ボーレートクロックを生成する通信ボーレ た基準クロックにより受信キャリアを生成する受信キャ する送信キャリア生成手段と、上記分周手段で生成され ーダライタにおいて、外部から入力されるクロックを分 リア生成手段と、上記分周手段で生成された基準クロッ 【請求項5】 墓準クロック値、送信キャリア周波数 【射泉項6】 上記制御手段で制御されるデータ加工は、国期キャラクタデータの付加・判除、CRC演算データの付加・判除、フレーム開始・プレーム終了キャラータの付加・削除、及びこれらの組み合わせであることを特徴とする新泉項5記載のリーダライタ。

する制御粜子を有したリーダライタの通信条件設定方法 受信キャリア周波数、通信ボーレートクロック値を決定 リア周波数を設定し、上記生成する通信ボーレートクロ いて上紀生成する基準クロック値を股定し、上紀生成す 信キャリア周波数、受信キャリア周波数、通信ボーレー であって、外部から入力されるクロックを分周して基準 るリーダライタの通信条件設定方法。 ック値を設定するステップと、からなることを特徴とす る送信キャリア周波数を設定し、上記生成する受信キャ トクロック値の情報を受信し、この受信した情報に基づ ップと、上記制御菜子で決定された基準クロック値、送 **クにより受信キャリアを生成するステップと、上記基準** クロックを生成するステップと、この基準クロックによ クロックにより通信ボーレートクロックを生成するステ 【請求項7】 基準クロック値、送信キャリア周波数、 送信キャリアを生成するステップと、上記基準クロッ

【翻採項8】 基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を決定 する制御菓子を有したリーダライタの通信条件設定方法 であって、外部から入力されるクロックを分周して基準 クロックを生成するステップと、この基準クロックを分 別して送信キャリアを生成するステップと、上記基準ク 50

ロックを分開して受信キャリアを生成するステップと、上記基準クロックを分開して通信ボーレートクロックを 生成するステップと、上記制御素子で決定された基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値のシリアルデータを受信し、この受信したシリアるデータを解読して上記基準クロック値を生成する分周値を設定し、上記受信キャリア周波数を生成する分周値を設定し、上記受信キャリア周波数を生成する分周値を設定し、上記過信ボーレートクロック値を生成する分周値を設定し、上記過信ボーレートクロック値を生成する分周値を設定するステップと、からなることを特徴とするリーダライタの通信条件設定方法。

ることを特徴とするリーダライタの通信条件設定方法。 る識別情報を検索して通信条件情報を呼び出し、この通 一トクロック値を含む通信条件情報に識別情報が付与さ 送信キャリア周波数、受信キャリア周波数、通信ボーレ ートクロックを生成するステップと、基準クロック値、 ステップと、上記基準クロックにより受信キャリアを生 報を指定して通信条件を決定する制御索子を有したリー 生成する受信キャリア周波数を設定し、上記生成する通 信条件情報に含まれる上記生成する基準クロック値を認 受信し、この受信した識別情報を用いて上記記憶してい 紀制御菜子で決定された通信条件を指定する離別情報を れた複数の通信条件情報を予め記憶するステップと、上 成するステップと、上記基準クロックにより通信ボーレ プと、この基準クロックにより送信キャリアを生成する れるクロックを分周して基準クロックを生成するステッ ダライタの通信条件設定方法であって、外部から入力さ **信ボーレートクロック値を設定するステップと、からな** 定し、上記生成する送信キャリア周波数を設定し、上記 【精求項9】 複数の通信条件情報に付与された識別情

8 ロックを分周して送信キャリアを生成するステップと、 クロック値を生成する分周値を含む通信条件情報に離別 キャリア周波数、受信キャリア周波数、通信ボーレート テップと、上記基準クロックを分周して通信ボーレート ライタの通信条件設定方法。 別情報を受信し、この受信した餓別情報を用いて上記記 周して基準クロックを生成するステップと、この基準ク 件設定方法であって、外部から入力されるクロックを分 僧報を決定する制御素子を有したリーダライタの通信条 設定するステップと、からなることを特徴とするリータ 設定し、通信ボーレートクロック値を生成する分周値を 周値を設定し、受信キャリア周波数を生成する分周値を する分周値を設定し、送信キャリア周波数を生成する分 し、この通信条作情報に含まれる基準クロック値を生成 億している識別情報を検索して通信条件情報を呼び出 プと、上記制御菜子で決定された通信条件を指定する簡 情報が付与された複数の通信条件を予め記憶するステッ クロックを生成するステップと、基準クロック値、送信 上記基準クロックを分周して受信キャリアを生成するス 【請求項10】 複数の通信条件情報に付与された顔別

> 成するステップと、上記設定された受信キャリア周波数 される送信キャリア、上記散定された通信ボーレートク 準クロック値を設定し、上記生成する送信キャリア周波 受信キャリア周波数、通信ボーレートクロック値の情報 ボーレートクロックを生成するステップと、上記制御募 成するステップと、上記基準クロックにより受信キャリ 決定する制御粜子を有して、無線カードと無線通信を行 数、受信キャリア周波数、通信ボーレートクロック値を るステップと、上記送信データに対するデータ加工を制 で生成される受信キャリア、上記通信ボーレートクロッ 御来子から送信される送信データとから変調データを生 ロック値で生成される通信ボーレートクロック、上記制 ステップと、上記設定された送信キャリア周波数で生成 し、上紀生成する通信ボーレートクロック値を設定する 数を設定し、上紀生成する受信キャリア周波数を設定 を受信し、この受信した情報に基づいて上記生成する基 子で決定された基準クロック値、送信キャリア周波数、 ステップと、この基準クロックにより送信キャリアを生 入力されるクロックを分周して基準クロックを生成する **うリーダライタの通信条件散定方法であって、外部から** ードから受信した受信データとから復調データを生成す ク値で生成される通信ボーレートクロック、上記無線カ アを生成するステップと、上記基準クロックにより通信 【荫求項11】 基準クロック値、送信キャリア周波

【発明の詳細な説明】

[0001]

信条件配定方法。

テップと、からなることを特徴とするリーダライタの通

御し、上記復調データに対するデータ加工を制御するス

【発明の属する技術分野】この発明は、上位装置と無線 カードとの間でデータのやり取りを行い、これらとのインターフェースと全体を制御するMPUとからなるリーダライタとリーダライタの適信条件説定方法に関する。

【従来の技術】従来、無線カード用の無線カード処理システムは、ホスト(上位装置、PC)とリーダライタ(R/W)と無線カードとからなる。上記リーダライタは、ホスト(PC)と無線カードとを接続するものである。このリーダライタは、全体を制御するMPUとLS「からなるインターフェースと送受信回路とにより構成されている。

【0003】無線(IC)カードは、その種類個々により様々な通信条件で動作している。これまでこれら無線カードとの通信条件で動作している。これまでこれら無線カードとの通信条件に合致した通信モードを持ったものを各々製作していた。従って、Aという通信条件を有した無線カードにはA'というリーダライタを、Bという通信条件を有した無線カードにはB'というリーダライタを用食する必要がある。

【0004】ここで言う通信条件とは、「受信キャリア 50

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ア周波 周波数」、「送信キャリア周波数」、「送受信通信ボーック値を レート」のことである。
レート」のことである。
【0005】しかしながら、無線カードそれぞれの通信 外部から 条件に合わせてリーダライタを作ることは開発効率が大生成する 変悪い。また、通信条件のみが異なるだけで、その他のリフを生 機能が全く同等のリーダライタを無線カードの運動分だ信キャリ け作り込むことは技術的には問題無いが、開発効率およより通信 グメンテナン面では大変な労力が発生し効率が悪くなどいう問題があった。

[0006]

【発明が解決しようとする課題】上記したように、無線カードそれぞれの通信条件に合わせてリーダライタを作ることは開発効率が大変更く、通信条件のみが異なるだけで、その他の機能が全く同等のリーダライタを無験カードの種類分だけ作り込むことは技術的には問題無いが、開発効率およびメンテナンス面では大変な労力が発生し効率が悪くなるという問題があった。

【0007】そこで、この発明は、さまざまな通信条件に対応する汎用性を持たせ、開発効率およびメンテナンスの効率を向上させることのできるリーダライタとリーダライタの通信条件配定方法を提供することを目的とす

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ャリア生成手段に設定し、上記受信キャリア生成手段で キャリアを生成する送信キャリア生成手段と、上記分周 は、基準クロック値、送信キャリア周波数、受信キャリ 手段で生成された基準クロックにより受信キャリアを生 ア周波数、通信ボーレートクロック値を決定する制御素 に設定する設定手段とから構成されている。 段に設定し、上記通信ボーレート生成手段で生成する通 生成する受信キャリア周波数を上記受信キャリア生成手 ア生成手段で生成する送信キャリア周波数を上記送信キ **準クロック値を上記分周手段に設定し、上記送信キャリ** この受信した情報に基づいて上記分周手段で生成する基 ア周波数、通信ボーレートクロック値の情報を受信し、 れた基準クロック値、送信キャリア周波数、受信キャリ する通信ボーレート生成手段と、上記制御素子で決定さ れた基準クロックにより通信ボーレートクロックを生成 成する受信キャリア生成手段と、上記分周手段で生成さ と、この分周手段で生成された基準クロックにより送信 子を有したリーダライタにおいて、外部から入力される **信ボーレートクロック値を上記通信ボーレート生成手段** クロックを分周して基準クロックを生成する分周手段 【課題を解決するための手段】この発明のリーダライタ

【0009】この発明のリーダライタは、基準クロッカ値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を決定する制御業子を有したリーダーイタにおいて、外部から入力されるクロックを分周して基準クロックを生成する分周手段と、この分周手段での生成された基準クロックを分周して送信キャリアを生成

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与された複数の通信条件情報を予め記憶している記憶手 値、送信キャリア周波数、受信キャリア周波数、通信ボ 分周手段と、この分周手段で生成された基準クロックに から構成されている。 値を上記通信ボーレート生成手段に設定する設定手段と ボーレート生成手段で生成する通信ボーレートクロック 周波数を上記受信キャリア生成手段に設定し、上記通信 別情報を受信し、この受信した臨別情報を用いて上記記 段と、上記制御素子で決定された通信条件を指定する識 クを生成する通信ボーレート生成手段と、基準クロック リアを生成する受信キャリア生成手段と、上記分周手段 より送信キャリアを生成する送信キャリア生成手段と、 件情報に付与された識別情報を指定して通信条件を決定 手段に松定し、上紀送信キャリア生成手段で生成する送 ての上記分周手段で生成する基準クロック値を上記分周 億手段を検索し、検索して呼び出した通信条件情報とし で生成された基準クロックにより通信ボーレートクロッ 上紀分周手段で生成された基準クロックにより受信キャ 入力されるクロックを分周して基準クロックを生成する する短回来子を有したリーダライタにおいて、 外部から **言キャリア周波数を上記送信キャリア生成手段に般定** し、上紀受信キャリア生成手段で生成する受信キャリア 【0010】この発明のリーダライタは、複数の通信条 レートクロック値を含む通信条件情報に識別情報が付

【0011】この発明のリーダライタは、複数の通信条 40件的報に付与された識別情報を決定する制御素子を有したリーダライタにおいて、外部から入力されるクロックを分別して基準クロックを生成する分周手段と、この分周手段で生成された基準クロックを分別して送信キャリア生成手段と、上記分周手段で生成された基準クロックを分別して受信キャリアを生成する受信キャリア生成手段と、上記分周手段で生成された基準クロックを分別して受信キャリア生成主役と、上記分周手段で生成された基準クロックを生成する通信ボーレート生成手段と、上記分周手段で生成された基準クロックを生成する通信ボーレート生成手段と、基準クロックを生成する通信ボーレート生成手段と、基準クロックを生成する通信ボーレートを分別して適信ボーレートクロックを生成する通信ボーレート生成手段と、基準クロックを生成する通信ボーレート生成手段と、基準クロックが、送信キャリア周波数、通信ボーレー 50

トクロック値を生成する分周値を含む適信条件情報に識別情報が付与された複数の通信条件を予め記憶している記憶手段と、上記制御素子で決定された通信条件を指定する識別情報を受信し、この受信した識別情報を用いて上記記憶手段を検索し、検索して呼び出した通信条件情報としての基準クロック値を生成する分周値を上記分周手段に設定し、送信キャリア国被数を生成する分周値を上記分度手段に設定し、送信キャリア生成手段に設定し、受信キャリア組被数を生成する分周値を上記受信キャリア生成手段に設定し、通信ボーレートクロック値を生成する分周値を上記通信ボーレート生成手段に設定する設定手段とから構成されている。

【0012】この発明のリーダライタは、基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を決定する制御業子を有して、無線カードと無線通信を行うリーダライタにおいて、外部から入力されるクロックを分周して基準クロックを生成する分周手段と、この分周手段で生成された基準クロックにより送信キャリアを生成する送信キャリア生成手段と、上記分周手段で生成された基準クロックにより受信と、上記分周手段で生成された基準クロックにより受信を

リア生成手段で生成する受信キャリア周波数を上記受信 段で生成する基準クロック値を上記分周手段に散定し、 僧報を受信し、この受信した僧報に基づいて上記分周手 素子で決定された基準クロック値、送信キャリア周波 手段とから構成されている。 タに対するデータ加工を制御し、上記受信制御手段に対 で生成される通信ボーレートクロック、上紀無線カード 信データとから変調データを生成する送信制御手段と 段で生成する通信ボーレートクロック値を上記通信ボー 数を上記送信キャリア生成手段に散定し、上記受信キャ 数、受信キャリア周波数、通信ボーレートクロック値の して上記復調データに対するデータ加工を制御する制御 信制御手段と、上記送信制御手段に対して上記送信デー から受信した受信データとから復調データを生成する受 生成される受信キャリア、上記通信ボーレート生成手段 上記設定手段で設定された上記受信キャリア生成手段で **信ボーレートクロック、上記制御素子から送信される送** キャリア、上記通信ボーレート生成手段で生成される通 設定された上記送信キャリア生成手段で生成される送信 レート生成手段に設定する設定手段と、この設定手段で キャリア生成手段に設定し、上記通信ボーレート生成手 上記送信キャリア生成手段で生成する送信キャリア周級

【0013】この発明のリーダライタの通信条件設定方法は、基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値を決定する制御 東子を有したリーダライタの通信条件設定方法であって、外部から入力されるクロックを分周して基準クロッ

ケを生成するステップと、この基準クロックにより送信キャリアを生成するステップと、上記基準クロックにより受信キャリアを生成するステップと、上記基準クロックにより通信ボーレートクロックを生成するステップと、上記制御来子で決定された基準クロック値、送信キャリア周波数、受信キャリア周波数、通信ボーレートクロック値の情報を受信し、この受信した情報に基づいて上記生成する基準クロック値を設定し、上記生成する送信キャリア周波数を設定し、上記生成する受信キャリア周波数を設定し、上記生成する受信キャリア周波数を設定し、上記生成する受信キャリア自該数を設定し、上記生成する受信キャリア自該数を設定し、上記生成する通信ボーレートクロック値を設定するステップとからなることを特徴とする。

生成する分周値を設定し、上紀送信キャリア周波数を生 値、送信キャリア周波数、受信キャリア周波数、通信ポ 準クロックを分周して通信ボーレートクロックを生成す を分周して受信キャリアを生成するステップと、上記基 送信キャリアを生成するステップと、上記基準クロック 法は、基準クロック値、送信キャリア周波数、受信キャ 生成する分周値を設定するステップとからなることを特 成する分周値を設定し、上記受信キャリア周波数を生成 信したシリアるデータを解説して上記基準クロック値を るステップと、上記制御素子で決定された基準クロック クを生成するステップと、この基準クロックを分周して 素子を有したリーダライタの通信条件設定方法であっ リア周波数、通信ボーレートクロック値を決定する制御 する分周値を設定し、上記通信ボーレートクロック値を ーレートクロック値のシリアルデータを受信し、この受 て、外部から入力されるクロックを分周して基準クロッ

ロックを生成する通信ボーレート生成手段と、上記制御

キャリアを生成する受信キャリア生成手段と、上紀分周 手段で生成された基準クロックにより通信ポーレートク

紀生成する送信キャリア周波数を設定し、上記生成する 報に含まれる上記生成する基準クロック値を設定し、上 報を検索して通信条件情報を呼び出し、この通信条件情 この受信した識別情報を用いて上記記憶している識別情 の通信条件情報を予め記憶するステップと、上記制御素 ック値を含む通信条件情報に識別情報が付与された複数 リア周波数、受信キャリア周波数、通信ボーレートクロ ックを生成するステップと、基準クロック値、送信キャ テップと、上記基準クロックにより通信ボーレートクロ と、上記基準クロックにより受信キャリアを生成するス の基準クロックにより送信キャリアを生成するステップ ックを分周して基準クロックを生成するステップと、こ の通信条件設定方法であって、外部から入力されるクロ 法は、複数の通信条件情報に付与された識別情報を指定 受信キャリア周波数を設定し、上記生成する通信ボーレ 子で決定された通信条件を指定する識別情報を受信し、 して通信条件を決定する制御索子を有したリーダライタ ートクロック値を設定するステップとからなることを特 【0015】この発明のリーダライタの通信条件般定方

【0016】この発明のリーダライタの通信条件設定方 50

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法は、複数の通信条件情報に付与された臨別情報を決定する制即来子を有したリーダライタの通信条件配定方法であって、外部から入力されるクロックを分属して基準クロックを生成するステップと、この基準クロックを生成するステップと、上記基準クロックを分周して受信キャリアを生成するステップと、上記基準クロックを分周して受信キャリアを生成するステップと、上記基準クロックを分周して通信ボーレートクロックを

周して送信キャリアを生成するステップと、上記基準クロックを分周して受信キャリアを生成するステップと、上記基準クロックを分周して受信ホーレートクロックと生成するステップと、上記基準クロックを分周して通信ボーレートクロックを生成するステップと、基準クロック値、送信キャリア周波数、通信ボーレートクロック値を生成する分周値を含む通信条件を報に識別情報が付与された視数の通信条件を予め記憶するステップと、上記制算案子で決定された通信条件を指定する既別情報を受信し、この受信した識別情報を用いて上記記憶している意別情報を検索して通信条件情報を呼び出し、この通信条件情報に含まれる基準クロック値を生成する分周値を設定し、送信キャリア周波数を生成する分周値を設定し、受信キャリア周波数を生成する分周値を設定し、受信ボーレートクロック値を生成する分周値を設定し、通信ボーレートクロック値を生成する分周値を設定するステップとからなることを特徴とする。

ଞ た基準クロック値、送信キャリア周波数、受信キャリア ロックを生成するステップと、上記制御素子で決定され ロックを分周して基準クロックを生成するステップと、 法は、基準クロック値、送信キャリア周波数、受信キャ た受信データとから復調データを生成するステップと 信キャリア、上記通信ボーレートクロック値で生成され される送信データとから変調データを生成するステップ される通信ボーレートクロック、上記制御衆子から送信 リア、上記設定された通信ボーレートクロック値で生成 記散定された送信キャリア周波数で生成される送信キャ る通信ボーレートクロック値を設定するステップと、上 を設定し、上記生成する送信キャリア周波数を設定し、 の受信した情報に基づいて上記生成する基準クロック値 **超波数、通信ボーレートクロック値の情報を受信し、こ** ステップと、上記基準クロックにより通信ボーレートク プと、上記基準クロックにより受信キャリアを生成する この基準クロックにより送信キャリアを生成するステッ タの通信条件設定方法であって、外部から入力されるク 素子を有して、無線カードと無線通信を行うリーダライ リア周波数、通信ボーレートクロック値を決定する制御 【0017】この発明のリーダライタの通信条件設定方 ることを特徴とする。 データに対するデータ加工を制御するステップとからな 上記送信データに対するデータ加工を制御し、上記復開 **る通信ボーレートクロック、上記無線カードから吹信し** と、上記数定された受信キャリア周波数で生成される受 上配生成する受信キャリア周波数を設定し、上記生成す

[8100]

【発明の実施の形態】以下、この発明の一実施の形態に ついて図面を参照して説明する。

50 【0019】図1は、この発明に係わる無線カード処理

のリーダライタ2のアンデナ部3との間で無機通信を行 位装置としてのパーソナルコンピュータ(PC)1と、 このPC1に接続されるリーダライタ(R/W) 2とこ S16、送受信回路7、アンテナ部3、及び入力クロッ を制御する制御回路(制御柴子)としてのMPU5、イ 示部、リーダライタ2の接続部により構成されている。 ク分周回路21とにより構成されている。 ら無線(I C)カードイ、…とにより構成されている。 【0020】すなわち、無線カード処理システムは、上 【0022】リーダライタ2は、リーダライタ2の全体 【0021】PC1は、図示しない制御部、操作部、表 /ターフェースとしての無線カードリーダライタ用のし

シリアルデータのインプット、アウトプット用のS10 M. ROMからなるメモリ12, LS16との通信用の PU11、制御プログラム、各種情撮を記憶し、RA 【0023】MPU5は、MPU5の全体を制御するC 3により構成されている。

ドコマンドの送信を行うようになっている。 リードコマンドの受信に対して、LSI6にデータリー 一夕のやり取りが行われるものであり、たとえばデータ 【0024】CPU11は、上記PC1に接続され、デ 8

【0025】上記S1013には、シリアルインプット データ(S1)用の1/Oボート、シリアルアウトプッ NT)用のI/Oボートが散けられている。 (SCK) 用の1/0ポート、コントロール信号 (CO トデータ (SO) 用の1/Oボート、シリアルクロック

リードコマンドをSI用のI/OボートからしSI6へ 出力するものである。 【0026】上記S1013は、無線カード4のデータ

アンテナ15により構成されている。 【0027】アンテナ部3は、送信アンテナ14、受信

回路17により構成されている。 【0028】上紀送受信回路7は、送信回路16、受信

回路、送受信アンテナにより構成されている。 の各種情報を記憶するメモリ、変調復調回路、電源発生 路、制御プログラム、私数、ID(認識番号)データ等 【0029】無線カード4は、全体を制御する制御回

回路(変調回路)26、及び受信制御回路(復期回路) 生成回路24、通信ボーレート生成回路25、送信制館 ある。I.S.1.6は、入力クロック分周回路2.1、MPU 27とから構成されている。 1/F22、送信キャリア生成回路23、受信キャリア 【0030】図2は、LSI6の概略構成を示すもので

準となるクロックを生成するものである。例えば、1/ タ2に入力される外部クロックを分周し、システムの基 汎用性のあるものにすることが出来る。 とにより、本発明による汎用リーダライタの機能をより 【0031】入力クロック分周回路21は、リーダライ | , 1 / 1 | 5 , 1 / 2 , 1 / 4 等の分周値を設けるこ

> 定を行う。 ・デコードすることにより、上記入力クロック分周回路 F)回路である。MPU5からのシリアルデータを受信 路24、通信ボーレート生成回路25の各レジスタの制 21、送信キャリア生成回路23、受信キャリア生成回 ウェアにて自動的に行うためのインターフェース(1/ ジスタの設定をMPU5のシリアル端子を介してソフト リア生成回路24、通信ボーレート生成回路25の各レ ク分周回路21、送信キャリア生成回路23、受信キャ 【0032】MPU1/F回路22は、上記入力クロ»

ある。基準クロックを任意の値に分周することにより実 ード4への送信キャリア周波数を設定するためのもので ク分周回路21で生成された基準クロックより、無線カ 【0033】送信キャリア生成回路23は、入力クロッ

ることにより実現する。 るためのものである。基準クロックを任意の値に分周す ード 4 からの受信データの受信キャリア周波数を設定す **ク分周回路21で生成された基準クロックより、無線カ** 【0034】受信キャリア生成回路24は、入力クロッ

6倍の周波数)を設定するためのものである。基準クロ カード 4 との通信ボーレート クロック(ボーレートの 1 ック分周回路21で生成された基準クロックより、無筋 ックを任意の値に分周することにより実現する。 【0035】通信ボーレート生成回路25は、入力クロ

PUI/F回路22からの送信データにより、無線カー 成回路25で生成された通信ボーレートクロックと、M 路23で生成された送信キャリアと、通信ボーレート生 ド4への変調データを生成する回路である。 【0036】送信制御回路26は、送信キャリア生成回

受信キャリアと、通信ボーレート生成回路25で生成さ 受信データと、受信キャリア生成回路24で生成された データを生成する回路である。 れた通信ボーレートクロックにより、MPU5への復謀 【0037】受信制御回路27は、無線カード4からの

イタ2の動作を図3のフローチャートを参照して説明す 【0038】次に、このような構成において、リーダラ

/F回路22は、MPU5との通信プロトコルとしての 初期通信モードの判定を行う(S T 2)。 【0039】電源が投入された際 (ST1)、MPUI

の分周値を設定し (ST3)、送信キャリア生成回路2 股定する (ST6)。 ードした通信条件に基づいて入力クロック分周回路2 5)、通信ボーフート生成回路25の通信ボーフートや 3の送信キャリア周波数を散定し(S T 4)、受信キャ 受信し、受信した通信条件情報をデコードし、このデコ は、MPU5よりシリアル通信を介して通信条件情報を リア生成回路24の受信キャリア周波数を設定し(ST 【0040】この判定に従ってMPUI/F回路22

> 効にし(ST8)、無線カード4との通信を開始する 信し、その他のモードを設定し(ST7)、全設定を有 5 よりシリアル通信を介してその他のモードの情報を受 【0041】そして、MPUI/F回路22は、MPU

【0042】上述したステップST3~6のルーチンに

れているソフトウェアにより電源投入後、自動的に行わ シリアル I /Fを用いてMPU5のメモリ I 2に配憶さ し、この制定順は問わない。これら制定は、MPU5の より、無線カード4との通信条件が設定される。ただ

信条件で動作する無線カード4との通信を可能とするた 成した第1実施例を図4を参照して説明する。下記の通 めのリーダライタ2の既定は次のようになる。 [0044]通信条件 【0043】次に、リーダライタ2における具体的に樹

通信ボーレート:7800bps 受信キャリア周波数:62.5kHz 送信キャリア周波数:125kHz 入力クロック周波数:16MHz

MPU1/F回路22は、図3で示したフローにのっと 予めどのような値を設定するかを決める。 デップST3~6での各レジスタを設定するに当たり、 りリーダライタ2の設定を行う。まず、MPU5は、ス

回路25の各レジスタに対して設定する。 23、受信キャリア生成回路24、通信ボーレート生成 し、入力クロック分周回路21、送信キャリア生成回路 決定した値をMPU5よりシリアル通信を介して受信 【0045】続いて、MPUI/F回路22は、ここで

定は以下のようになる。 【0046】ここでの通信条件に対する各レジスタの設 ಜ

ック分周値を1/2に設定し、入力クロック(16MH ック (8MHz) を生成する。 z)から、リーダライタ2の動作の基本となる基準クロ 【0047】a. 入力クロック分周回路21の入力クロ

分周値を1/64に設定する。 た基準クロックに対しての送信キャリア周被数(125 k H z)を生成するため、送信キャリア生成回路23の 【0048】b. 入力クロック分周回路21で生成され

た基準クロックに対しての受信キャリア周波数(62. 5 k H z)を生成するために、受信キャリア生成回路 2 4の分周値を1/128に設定する。 【0049】c. 入力クロック分周回路21で生成され

ックは、ボーレートの16倍の周波数である。 の分周値を1/64に設定する。ここで生成されるクロ ps)を設定するために、通信ボーレート生成回路25 た基準クロックに対しての通信ボーレート(7800b 【0050】d. 入力クロック分周回路21で生成され

条件を備えた無線カード 4 との通信が可能となる。ただ 【0051】このように設定することにより、上記通信

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ならないというわけではない。各レジスタの設定値はシ 配通信条件に対して必ずしもこのように設定しなければ し、a, b, c, dの殿定類は問わない。また、ここで示した各レジスタの設定値(分周値)は一例であり、上 ステム設定者が任意に指定できる。 【0052】次に、リーダライタ2における具体的に樹

【0053】MPU1/F回路22は、図3で示したフ つ、その街の条件は図45回じたある。 した通信条件に対して、人力クロックを8MHzに変更

成した第2実施例を図5を参照して説明する。図4で示

ローにのっとりリーダライタ2の設定を行う。 【0054】a. 入力クロック分周回路21の入力クロ

生成回路23の分周値、c. 受信キャリア生成回路24 ック (8MHz) を生成する。なお、b. 送信キャリア ック分周値を1/1に股定し、入力クロック(8MH 関しては図4と同じである。 の分周値、d. 通信ボーレート生成回路25の分周値で z)から、リーダライタ2の動作の基本となる基準クロ 【0055】このように設定することにより、上記通信

値はシステム散定者が任意に指定できる。 し、上記a, b, c, dの散定順は問わない、また、 条件を備えた無線カード4との通信が可能となる。ただ 成した第3実施例を図6を参照して説明する。下記通信 り、上記通信条件に対して必ずしもこのように設定しな ければならないというわけではない。 各レジスタの概定 こで示した各レジスタの設定値(分周値)は一例であ 【0056】次に、リーダライタ2における具体的に構

のリーダライタ2の設定は次のようになる。 【0057】通信条件

条件で動作する無線カード 4 との通信を可能とするため

送信キャリア周波数:3.322MHz 受信キャリア周波数:847.5kHz 通信共一フート:106 k b p s 入力クロック周波数:1 3. 56MH z

MPU1/F回路22は、図3で示したフローにのっと 予めどのような値を設定するかを決める。 テップST3~6での各レジスタを設定するに当たり、 りリーダライタ2の配定を行う。まず、MPU5は、ス

決定した値をMPU5よりシリアル通信を介して受信 回路25の各レジスタに対して設定する。 2 3 、受信キャリア生成回路 2 4 、通信ボーレート生成 し、入力クロック分周回路21、送信キャリア生成回路 【0058】続いて、MPU1/F回路22は、ここで

定は以下のようになる。 【0059】ここでの通信条件に対する各レジスタの設

6MHz)から、リーダライタの動作の基本となる基準 ック分周値を1/1に設定し、入力クロック(13.5 クロック (13.56MHz) を生成する。 【0060】a. 入力クロック分周回路21の入力クロ

【0061】b. 入力クロック分周回路21で生成され

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23の分間値を1/4に概定する。 22MHz)を生成するために、送信キャリア生成回路 た基準クロックに対しての送信キャリア周波数(3.3

路 2 4 の分周値を1 、1 6 に数定する。 た基準クロックに対しての受信キャリア周波数(8.4 【0062】c. 入力クロック分周回路21で生成され . 5 k H z) を生成するために、受信キャリア生成回

た基準クロックに対しての通信ボーレート(106kb は、ボーレートの16倍の間波数である。 の分周値を1/8に散定する。ここで生成するクロック ρ s)を数定するために、通信ボーフート生成回路 2 5 【0063】d. 入力クロック分周回路21で生成され 5

ならないというわけではない。各レジスタの概定値はシ 記通信条件に対して必ずしもこのように設定しなければ 示した各レジスタの概定値(分周値)は一例であり、上 し、a, b, c, dの数定版は問わない。また、ここで 条件を備えた無線カード4との通信が可能となる。ただ ステム股定者が任意に指定できる。 【0064】このように散定することにより、上記通信

は、追加機能として通信条件設定データ格納メモリ28 した第4実施例を図7を参照して説明する。本実施例で 【0065】次に、リーダライタ2における構成を応用 8

理が発生し煩雑となる。 MPU5より数定する必要がある。それぞれ個別にレジ スタをアクセスして散定しているが、これでは何度も処 とするために、ステップST3~6の各版定レジスタを 作している無線カード 4 に対してリーダライタ 2 を有数 【0066】上記に示した通り、ある通信条件の基で製

報より通信条件レジスタを自動的に設定する。 定する。MPUI/F回路22は、指定されたメモリ情 愈し、MPU5はメモリ情報のどれを有効にするかを指 予め記憶させた通信条件設定データ格納メモリ10を用 【0067】そこで、本実施例では、これら粉定情報を

レローチャートを参照して認思する。 【0068】ここで、本第4実施例の処理動作を図8の

の初期通信モードの判定を行う(ST12)。 1 / 下回路 2 2 は、MPU5との通信プロトコルとして 【0069】 **恒原が投入された際(STII)、MPU**

いて入力クロック分周回路21の分周値を設定し(ST 件数定データ格納メモリ28からメモリ情報を呼び出し メモリ情報のどれを有効にするかの指定に従って通信条 ート生成回路25の通信ボーレートを敷定する(ST1 受信キャリア周波数を散定し(S T 1 7)、通信ボーレ 数を設定し(S T 1 6)、受信キャリア生成回路24の T 1 4)、このデコードした通信条件数定データに基づ 【0070】MPUI/F回路22は、MPU5からの (ST13)、このメモリ情報の内容をデコードし(S 5)、送信キャリア生成回路23の送信キャリア周波 5

> 5 よりシリアル通信を介してその他のモードを販定し (ST19)、全般定を有効にし(ST20)、無線カ 【0071】そして、MPUI/F回路22は、MPU

1/32と制定されている。 信キャリア1/1、受信キャリア1/16、ボーレート が15010×××モードの場合、アドレスが00番 地、機能(レジスタ設定値)が入力クロック1/1、送 8 に格納するメモリ情報の構成例である。例えば、仕様 ード4との通信を開始する(ST21)。 【0072】図9は、通信条件設定データ格納メモリ2

格納メモリ28の00番地を有効にする事により、リー した設定にするとき、MPU5は、通信条件設定データ 定情報を配置しておく。 ISO10×××モードに合致 とに通信条件般定データ格納メモリ28内にレジスタ散 ダライタ2の概定をすることが出来る。 【0073】このメモリ情報の構成例では、機能仕様ご

信ボーレート:7800bpsの場合、アドレスが00 送信キャリア1/6 4、受信キャリア1/128、ボー 番地、機能(レジスタ設定値)が入力クロック1/2、 ば、仕様が、入力クロック:16MH2、送信キャリ 28に格納するメモリ情報の他の構成例である。例え 【0074】図10は、通信条件設定データ格納メモリ

格納メモリ10の00番地を有効にすると、リーダライ を通信条件設定データ格納メモリ28の00番地に設定 定情報を配置しておく。例えば、図 4 で示した通信条件 とに通信条件設定データ格納メモリ28内にレジスタ設 タ2の設定がこの通信条件に合致したものになる。 しておくことにより、MPU5より通信条件設定データ 【0075】このメモリ情報の構成例では、通信条件ご

【0076】次に、第5実施例を図11を参照して説明

送信制御回路31と受信制御回路32である。 【0077】本第5実施例における図2との相違点は、

信号により、送信データに対してデータ加工の有無を制 より、無線カード4への変調データを生成する回路であ ボーフート生成回路25で生成された通信ボーレートク る。また、MPUI/F回路22よりのデータ処理制御 ロックと、MPUI/F回路22からの送信データとに ャリア生成回路23で生成された送信キャリアと、通信 【0078】送信制御回路(変調回路)31は、送信さ

クタのキャラクタ値およびキャラクタ長は別途MP U 5 1) 同期キャラクタデータの付加。このとき同期キャラ

【0080】2)CRC演算データの付加。

プキャラクタの行首。フレーム語名/栞プキャラクタの

【0081】3)フレーム開始キャラクタ/フレーム終

ア:125kHz、受信キャリア:62.5kHz、通 ワート1/64と数定されている。

【0079】具体的には、

より任意に指定できる。

付加は個別に指定できる。 【0082】の機能を擁する。

UI/F回路22よりのデータ処理制御信号により、復 ード4からの受信データと、受信キャリア生成回路24 調データに対してデータの加工の有無を制御できる。 U 5への復調データを生成する回路である。また、MP 2.5で生成された通信ボーレートクロックにより、MP で生成された受信キャリアと、通信ボーレート生成回路 【0083】受信制御回路(復調回路)32は、無線な

1) 同期キャラクタデータの削除。このとき同期キャラ 【0084】具体的には、

より任意に指定できる。 クタのキャラクタ値およびキャラクタ長は別途MPU 5

【0085】2)CRC演算確認機能(エラー検出機

了キャラクタの削除。 フレーム開始/終了キャラクタの 【0086】3)フレーム臨路キャラクタ/フレーム禁

【0087】の機能を擁する。

せをすべて示したものではない。 るものはあくまでも具体例であり、実現できる組み合わ の加工を6種の具体例を示して説明する。ここで示され き本データである。以下、この基データに対するデータ されるシリアルデータであり、無線カード4に送信すべ 図12の(a)に示す基データとは、MPU5から送信 夕処理制御信号による送信データ加工の具体例である。 【0088】図12は、送信制御回路31におけるデー

対して、同期キャラクタを付加している。例えば、92 する場合の送信データの状態を示す。基データの先頭に Hのキャラクタを付加する。 【0089】(b)は、同期キャラクタを1パイト付加

対して、同期キャラクタを付加している。例えば、92 する場合の送信データの状態を示す。基データの先頭に 9 2 Hのキャラクタを付加する。 【0090】(c)は、同期キャラクタを2パイト付加

付加している。例えば、CRC16の演算をする場合 実行し、その演算結果を本データの最終データ送信後に 信データの状態を示す。基データに対してCRC演算を は、16ピットに演算結果が付加される。 【0091】 (d) は、CRC演算を付加する場合の送

ットの" Highレベル"を付加することが出来る。ま て10から11ピツトの"Lowレベル"と2から3ピ る場合の送信データの状態を示す。例えば、SOFとし フレーム (SOF) / 探了フレーム (EOF) を付加す ル"を付加することが出来る。 た、EOFとして10から11ピットの"Lowでく 【0092】(e)は、基データの前後にそれぞれ開始

【0094】(g)は、基データの後部に終了フレーム (SOF)を付加する場合の送信データの状態を示す。 【0093】(f)は、基データの前部に開始フレーム

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(EOF)を付加する場合の送信データの状態を示す。

【0095】受信制御回路32におけるデータ処理制御

のデータから基データを生成する)。 ラクタのみを削除した復調データを生成し、MPII5に に同期キャラクタの付加された復調データから同期キャ 対してシリアルデータとして送信する (図12の (b) 信号による復調データの加工は、図12の(b)~ (g)に示す送信データ加工の逆を行う。例えば、先廊

によれば、様々な通信条件(入力クロック周波数、受信 キャリア周波数、送信キャリア周波数、送受信通信ボー を実現することが出来る。 レート)を持つ無線カードに対応した汎用リーダライタ 【0096】以上説明したように上記発明の実施の形態

テムを個別に製作する必要が無くなり、開発効率、メン テナンスの効率が向上する。 り、それぞれの無線カードに対応したリーダライタシス 【0097】また、リーダライタを汎用化することによ

加することなしに実現しているため、MPUの基本的な ル1/Fを介して行うことが出来、特別難しい機能を付 操作方法を知るだけで容易に使いこなせることが出来 【0098】また、機能般定レジスタをMPUのシリア

ことによりMPUより自動的に設定することが可能とな 設定コマンドについてもメモリ内に信報を格納しておく 【0099】なお、送受信データの加工制御に関する各

率およびメンテナンスの効率を向上させることのできる さまざまな通信条件に対応する汎用性を持たせ、開発数 リーダライタとリーダライタの通信条件設定方法を提供 【発明の効果】以上詳述したようにこの発明によれば、

【図面の簡単な説明】

略構成を示す構成図。 【図1】この発明に係わる無線カード処理システムの概

キープ 【図3】リーダライタの動作を説明するためのフローチ 【図2】リーダライタの概略構成を示すプロック図。

成を示す図。 【図4】リーダライタにおける具体的な第1実施例の備

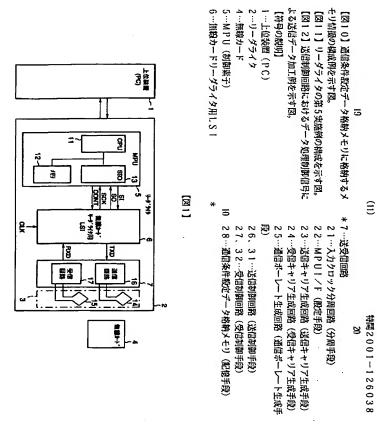
成を示す図。 【図6】リーダライタにおける具体的な第3実施例の構 【図5】リーダライタにおける具体的な第2実施例の構

例を示す図。 成を示す図。 【図7】リーダライタにおける榻成を応用した第4実施

ーチャート。 【図8】リーダライタの処理動作を説明するためのフロ

リ情報の構成例を示す図 【図9】通信条件設定データ格納メモリに格納するメモ

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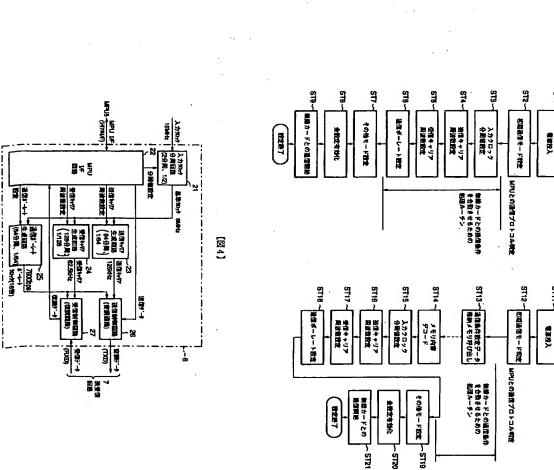
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[図2]

受信がっ

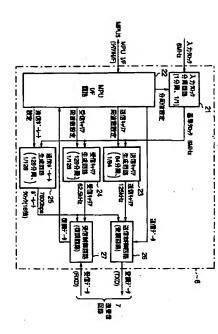
7 湖田倉

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	(RXD) □ □	(COCI) (TOCI) (TOCI) (+-1期5-1		

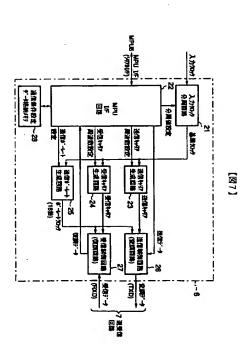
[図6]

[四9]

[図10]

 B対抗的け モード	A性向け モード2	A社向け モード1	ISO 14xx = 4	180 t0xx =- /-	住機
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<u> </u>	2222 2822	2525 2825	2222	2222	

 イーイーを記載 イバッキ記者 イバッキ記者 イバッキ記者	入力クロック 送信キャリア 受信キャリア 受信ポーレート	入力クロック 送信キャリア 受信キャリア 発信ポーレート	中華
: 19.56MHz : 3.39MHz : 847.564z : 106fdps	:8MHz :1256Hz :62.564z :7800tps	: 16MHz : 125MHz : 62.6Mz : 7800bps	
 =	01	00	アドレス
 入力クロック 協合キャリア 規合キャリア ポーレート	入力クロック 出合キャリア 収合キャリア ボーレート	入力クロック 送信キャリア 受信キャリア ポーレート	細胞レジスタ放定値
2222	2 <u>8</u> 22	282 252 2	100 mg



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(e) 開始フレーム(SOF)/終了フレーム(EOF)付近の場合 (EOF) (Deba 1)(Deba 2)(Deba 3)(EOF)((g) 終了フレーム(EOF)付加の場合 (c) 口間キャラクタ2パイトの場合 (A) #7-5 入力がか 基準なか 分回回路 聖年夏 受信卡汀 受信卡汀 受信卡疗 电波管验 生成器的 —24 (Data 1) (Data 2) (Data 3) (EOF.) X SOF X Data 1 X Data 2 X Data 3 X X Data 1 X Data 2 X Data 3 X [図12] データ処理製御信号 X Dem.1 (Dem.2 X Dem.3 X CHC P-9 X (______X_Data_1)(Data_2)(Data_2)(m,13++979 → 東南朝衛國路 奥市ゲーナ (復調国路) (PXO) F.400

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